OPERATING AND MAINTENANCE MANUAL

OF THE

MULTI-PACK ENVIRONMENTAL HANDLER

MODEL 8195

DELTA DESIGN
INC

SAN DIEGO, CALIFORNIA

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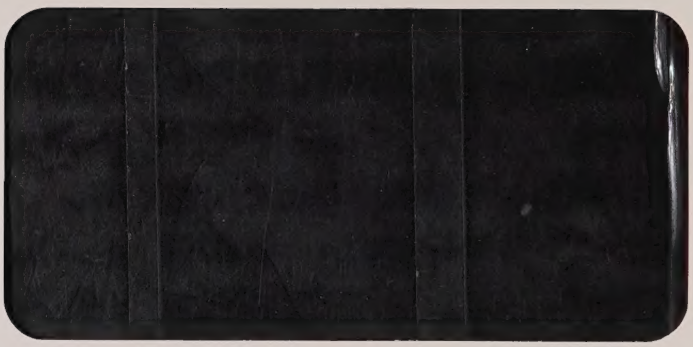

ENVIRONMENTAL CONTROL EQUIPMENT FOR RESEARCH AND INDUSTRY

OPERATING AND MAINTENANCE MANUAL

OF THE

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MODEL 8195

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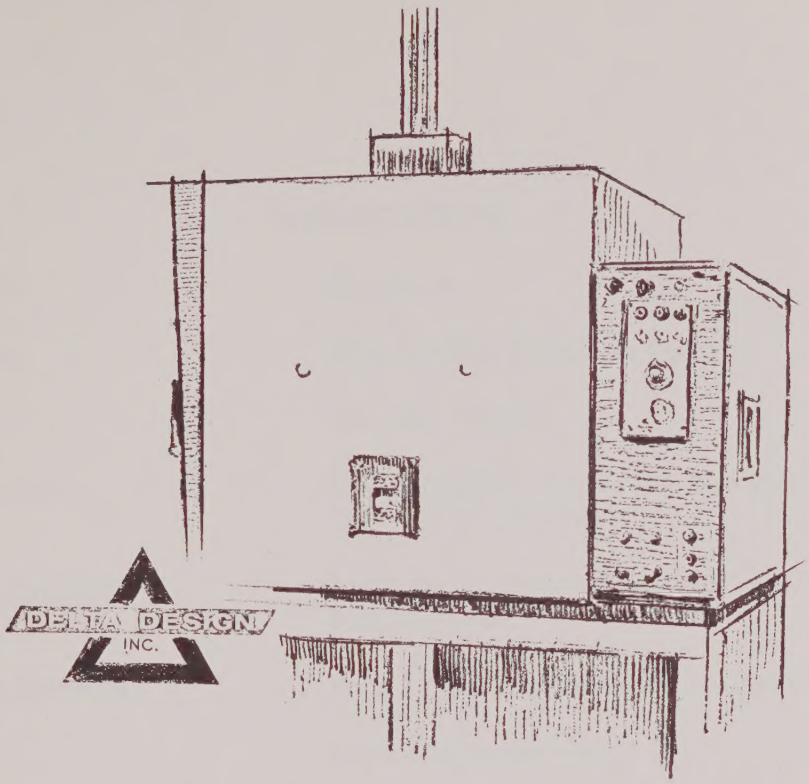

MULTI-PACK ENVIRONMENTAL HANDLER

SPECIFICATIONS

STORAGE CAPACITY:	19 ea. - 14 Lead DIP or Flat Pak or TO-5 (029) 6 ea. - 40 Lead DIP Devices in Carriers 9 ea. - 24 Lead DIP Devices in Carriers 9 ea. - 40 Lead Flat Pack Devices in Carriers
TEST VOLUME: (HxWxD)	18-1/2" x 21-3/4" x 17-1/4" (6950 cu.in.)
AIR CIRCULATION:	Two 140 CFM Centrifugal Blowers with Baffling to Provide Equal Air Distribution Throughout the Chamber. The Air Flow is in a Vertical Pattern.
OUTSIDE CASE DIMENSION:	27" x 37-7/8" x 26-9/16"
INNERLINER:	Type 302 Stainless Steel

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SPECIFICATIONS

OUTER CASE:	Aluminum
INSULATION:	Closed Cell Urethane Foam
WEIGHT:	400 lbs. (Net)
HANDLING RATE:	Mechanically Processes Devices at Rate of 3000 Parts per Hour
POWER REQUIREMENTS:	240V 60 Hz Single Phase AC or 208V 60 Hz Single Phase
HEATING ELEMENTS:	Four 17.5 Ohm Elements, Total of 3280 Watts
COOLING:	Liquid Nitrogen (LN_2)
PROGRAMMING:	Programmable
TEMPERATURE RANGE:	-65°C to +150°C
CONTROLS:	Power ON-OFF Switch and Light. Cool ON-OFF Switch and Light. Heat ON-OFF Switch and Light. Temperature Set Point Control. Manual/Program Control Switch (MODE) Transfer Control Switch: OUT-IN-REMOTE
RESETTABILITY:	±0.25°C
TEMPERATURE DEVIATION:	±0.1°C
LINE VOLTAGE STABILIZATION:	±0.25°F for 105 to 125 VAC, 60 Hz Line Voltage Change.
SOAK TIME MODULE: (MAXI TIMER)	Adjustable Pot for Zero to Twenty Seconds Temperature Soak Time for Devices.

INTRODUCTION

The Delta Model 8195 Handler provides mechanical handling rate of 3000 parts per hour for 14 thru 40 lead Dual Inline Pack and 14 thru 50 lead Flat Pack devices and TO-5 devices (in plastic carriers). Because of the limitation of number of devices in the chamber at one time, Delta has provided a soak time module adjustable from zero to twenty seconds for controlled thermal throughput of the device being tested. As is typical in the industry, the plastic carriers are used to properly orient the devices for conveying and testing. The location and positioning of the actuating mechanism within the chamber of the L.S.I. Charger makes it adaptable for interfacing with the high frequency electronic performance packages of all I.C. testers. (See Figure 2) There is one basic Handling Mechanism available for the Model 8195 Handler. It will be necessary to determine from the "Carrier - Handler Mechanism Orientation Chart" (-at back of this manual) which of the parts are needed for the carriers to be handled. In many instances it will be desirable to have on hand parts for different size carriers.

The Delta Design Contactor Assemblies are interfaced to the electronics package in such a manner as to permit fast interchange of performance boards and/or contactors. The Model 8195 Handler has an opening which receives the standard Delta Design DC or HF L.S.I. Charger Contactor and Seal Assemblies. For the proper selection of a test contactor assembly to mate with the device being tested, it is suggested that you confer with your Delta sales representative.

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1.0 PRELIMINARY SET-UP 8195 MULTI-PACK ENVIRONMENTAL HANDLER

1.1 Un-Crating - Remove all shipping tie downs.

1.2 LUBRICATION

Except for air cylinder lubrication as described in paragraph 5.5, no lubrication is necessary on the Model 8195 parts handling mechanism, since all bearings are self-lubricated.

1.3 ELECTRICAL CONNECTION

Electrical power required is 240 volts, 60 cycle, Hz., single phase AC, 3.3 KW.

1.3.1 For 208V operation a 208V to 240V boost transformer must be used. Delta Design will factory equip the Handler with the proper boost transformer if so requested at the time the order is placed. (See schematic D2633718)

1.3.2 The circuit to which the chamber is to be connected should have a 30 ampere minimum rating. The outlet must be of the polarised type with a grounding lug. Be sure that all switches are OFF

before plugging the chamber cord (Figure 1-1) into the outlet. THE CHAMBER MUST BE PROPERLY GROUNDED. Delta chambers that operate on 240 VAC employ a center-tapped auto transformer to obtain 120V for the coolant valve solenoid, failsafe relays, blowers and for the controller. The heater circuit operates on 240 VAC.

1.4 AIR CONNECTION

The air connection is shown in (Figure 1-2) and should be 100 P.S.I. minimum. Delta Design recommends a quick disconnect type fitting at this point.

1.5 LIQUID NITROGEN CONNECTION

Connect a liquid nitrogen withdrawal container to the LN_2 input fitting of the chamber with an insulated transfer line (Figure 1-13). A relief valve must be installed in the line with a relief pressure of between 60 and 100 P.S.I. for a 2700 cu. ft., 50 P.S.I. liquid withdrawal container. Liquid nitrogen is furnished by the supplier in withdrawal containers.

1.5.1 Water is very troublesome if it is allowed to enter the refrigerant lines. Steps must be taken to prevent this. All lines, valves and connecting hoses should be blown out before the chamber is connected. If lines are opened to bleed off excessive pressure at shutdown, close them to prevent contamination by condensed moisture. This will help to keep ice from forming in the control valve. Operation to temperatures as low as -65°C is possible with LN_2 as the coolant.

CAUTION LIQUID NITROGEN MAY CONTAIN TRACES OF LIQUID OXYGEN WHICH BOILS OFF LAST.

1.5.2 Any mixture of oil and liquid oxygen (LCO_2 could result from oxygen condensing from the atmosphere) can be explosive, so care should be taken to thoroughly insulate all lines and fittings, including, the sealing of exposed edges with RTV silicone, or a similar sealant.

1.5.3 A 60 P.S.I. valve and a stainless steel, expanded polystyrene insulated injector assembly (Figure 1-4) is used for the liquid nitrogen applications.

1.5.4 NOTE: LCO_2 from a tank will not operate properly in a chamber equipped for LN_2.

1.6 TEST CONTACTOR ASSEMBLY

Installation of any of the Delta test contactor assemblies to the Model 8195 is accomplished by inserting the contactor assembly into the front opening and tightening four (4) screws to retain in place. Care should be exercised to assure that the contactor assembly is properly oriented "up" as stamped. (NOTE: Threaded (1/4-20 Thd) mounting hole locations for interface with high frequency performance boards are shown on Figure 2).

1.6.1 While it is not mandatory it will be easier to insert the contactor assembly, if the transfer block is shifted to the "in" position.

CAUTION IT IS IMPERATIVE THAT THE CORRECT TEST CONTACTOR IS IN PLACE FOR THE TYPE ARTICLE BEING TESTED.

2.0 SYSTEM FUNCTIONAL DESCRIPTION

See Figure 3 for the system flow diagram

2.1 STARTING UP PROCEDURE AND SETTING CONTROLLER

See Figures 4 and 6 for illustration of controller operation and location.

2.2 PRECAUTIONS

Unplug the unit from all sources of power and air before performing any type of settings or servicing, or the removal of components. The carrier handling mechanism in particular should not be handled while the air line is connected to the unit.

2.2.1 Do not turn to COOL without LN_2 connected. Without a supply of LN_2 the coolant valve solenoid will remain in the "open" position for a prolonged period, thereby over-heating the holding coil.

2.2.2 Always operate the chamber at 150°C for at least 1/2 hour after prolonged operation below ambient temperature. This will allow any moisture build-up in the insulation to dry out.

2.2.3 Do not block air intakes for the blower motors and cooling fans (Figure 1-5).

2.2.4 Never replace a fuse (Figure 1-6) with other than the type originally used. Proper fuse rating is 20 AMP (fast blow). The use of improper fuses could cause damage to the equipment.

2.2.5 When operating below ambient temperature, the pressure of the liquid nitrogen must be kept constant. If this not done, the control temperature may fluctuate.

2.2.6 Do not leave liquid nitrogen trapped in a line (Valves closed at both ends) because high pressures will be developed as the liquid absorbs heat and becomes gas.

2.2.7 Connect SAFETY PLUG (Figure 1-7) when external programmer is not being used. This will preclude any programmer that is not being used. This will also preclude any possibility of high temperature being accidentally obtained if the MODE switch (Figure 5-3) is placed in the PROGRAM position with no programmer connected.

2.2.8 Ground the case of the chamber to earth ground. The chamber must not be operated without the case being grounded.

2.3 ADJUSTING THE FAILSAFE

The Failsafe is adjusted by rotating the slotted FAILSAFE control (Figure 6-1). The trip temperature is increased by rotating the control counter-clockwise. One full turn changes the trip temperature approximately 50°C.

2.3.1 The two recommended procedures for setting the Failsafe are:

(a) Operate the chamber at a known temperature. Read the temperature indication on the thermometer and ensure that the HEAT switch (Figure 5-5) is in the ON position. Turn the Failsafe control clockwise to lower the setting until the Failsafe Lamp turns on. This establishes the setting of the Failsafe. Estimate the number of turns required of the Failsafe control at 50°C per turn, and rotate the control counter-clockwise to the desired setting.

(b) Operate the chamber at the maximum temperature for the test and adjust the Failsafe control so that the Failsafe is on the verge of tripping.
NOTE: DO NOT ADJUST THE FAILSAFE MORE THAN ONE FULL TURN TOWARDS LOWER TEMPERATURES (CLOCKWISE ROTATION) AFTER THE FAILSAFE LIGHT COMES ON AS THE THERMOSWITCH UNIT CAN BE DAMAGED BY FORCING. ALSO° DO NOT SET THE FAILSAFE ABOVE 160°C OR THE CHAMBER INSULATION MAY BE PERMANENTLY DAMAGED.

2.4 CONTROLLER

The chamber operating temperature is set by dialing the number in degrees centigrade into the TEMPERATURE SET dial (Figure 5-2) on the control panel. Do not exceed the temperature limits of -65°C to +150°C.

2.4.1 After the temperature is selected, set the temperature MODE selector (Figure 5-3) to MANUAL, and turn on the POWER (Figure 5-4) HEAT (Figure 5-5), and COOL (Figure 5-1) switches.

2.4.2 The Model 8195 Handler controller includes the DeltaGuard which provides a constant monitoring of the chamber for temperature deviation protection. The DeltaGuard senses unwanted variations in temperature control as a failure indication rather than by sensing preset temperature limitations. When the red failure light (Figure 5-9) is on, the HEAT and COOL CIRCUITS are inoperative.

2.4.3 The DeltaGuard will indicate a failure condition due to the difference between the set and actual temperature. Depressing the RESET button will cause the red failure light (Figure 5-9) to go out and the yellow light (Figure 5-7) to come on. This indicates that the unit is in the STANDBY interval during which the temperature is stabilizing at the value dialed into the controller. When the unit has reached the set temperature, the yellow STANDBY light will go out and the green normal light (Figure 5-8) will come on. This will indicate that the temperature of the chamber has stabilized at the selected temperature.

2.4.4 The DeltaGuard also contains a failsafe circuit that shuts the installation down if the maximum safe temperature of 160°C is exceeded. This condition is indicated by the FAILSAFE light (Figure 5-9).

2.4.5 A failure condition indicated by a red failure light is also accompanied by an audible horn signal. This audible signal can be silenced by means of a switch (Figure 5-10) located on the control panel. It is recommended, however, that this switch be left in the SOUND position during normal operation.

2.4.6 The GUARD-BY-PASS switch (Figure 5-11) determines whether the DeltaGuard circuit is being used or by-passed. During normal operation the GUARD-BY-PASS switch should be left in the GUARD position.

2.4.7 The RESET button (Figure 5-12 is depressed when the operating temperature is changed by dialing in a new number in degrees centigrade into the TEMPERATURE SET dial (Figure 5-2).

2.4.8 The REMOTE, OUT, IN switch (Figure 5-13 functions as follows: In the REMOTE position the IC carrier handling mechanism portion of the Model 8195 will be goverened and cycled automatically in response to the external test equipment. The OUT position of the switch causes the handling mechanism to extend the IC carrier transfer block to the test contactor position and maintain it there.

2.4.9 The IN position of the switch causes the handling mechanism to retract the IC carrier transfer block to pick up a new carrier from the input chute and maintain it in the retracted position.

3.0 PRINCIPLE OF OPERATION

(See Figure 3 for system flow diagram).

Insertion of the loaded carrier magazine into the Input Chute automatically releases a supply of carriers to the handling mechanism. The lowermost of the stacked parts will drop into the top half of the Transfer Block where it rests upon the Positioning Fingers. For

proper setting of these parts, refer to par. 5.6. As the Transfer Block moves forward towards the test contactor (the "out position") the part drops into the lower half of the Transfer Block where it is presented in precise alignment to the test contactor. When the part has been tested one time, the Transfer Block retracts with the part to a mid-point it it's travel. The Deltaloop circuit takes over at that point and causes the Transfer Block to respond to an external signal (from customers equipment or manual sort control) in the following manner:

(A) The Transfer Block continues to retract to its original position where the tested part will drop out of the Transfer Block and into the Output Chute, or:

(B) The Deltaloop circuit takes over and causes the Transfer Block to reverse its travel and present the same part for re-probe to verify the test. Then the Transfer Block retracts fully to release the part and receive the second part.

3.1 MAXI-TIMER (Optional)

Extend soak time (exposure to environment) may be attained by adjustment of the Maxi-Timer (from 500ms to 20 seconds). The location of this adjustment is shown in Figure 6-7. Rotate clockwise to increase the time. The electrical schematic for this unit is Delta Drawing B1633965.

3.2 120V TRANSFORMER

The 120V transformer is shown on the Schematic D2633718, and is called out as reference designator T1. The 120V transformer is an auto-transformer. The purpose of the auto-transformer is to allow 120V equipment to be operated in a 240V environment. The two ends of the transformer are connected across the 240 VAC supply.

3.2.1 The 120V load is balanced across the 240V line with the center tap of the transformer supplying the unbalanced current.

4.0 CHAMBER AND CONTROLLER DESCRIPTION

4.1 CHAMBER

The chamber is a precision environmental temperature test chamber having a stainless steel interior, aluminum outer case and urethane insulation. The air circulation is closed and provided by 140 CFM blowers.

4.1.1 The chamber is heated by applying full wave power to bobbin wound nichrome heating elements via the HEAT solid state switch.

4.1.2 The chamber is cooled by injecting liquid nitrogen into the air stream through an expansion nozzle. The coolant flow is metered by a solenoid valve, controlled by the COOL solid state switch.

4.1.3 The temperature control system is shown in block diagram form as Figure 4.

4.2 SOLID STATE CONTROLLER

The controller compares the resistance of the temperature probe to the resistance of the TEMPERATURE SET Potentiometer. (The resistance of a remote programming resistor is compared to the probe resistance if the MODE Switch is in the PROGRAM position.)

4.2.1 The resistance of the probe will be either less than or equal to, or greater than the resistance of the TEMPERATURE SET Potentiometer (program resistance). These three situations directly correspond to the chamber temperature being lower than, equal to, or higher than desired. The controller applies heat, coolant, or withholds both to

obtain and maintain the selected temperature in the chamber.

4.4.2 MODE

The controller is a three mode unit, i.e.,

(a) Heat only

(b) No heat or coolant

(c) Coolant only

This mode of control ensures that LN_2 coolant is not wasted in a continuous cycling of the heaters and coolant valve such as would be the case for a simple two mode output controller.

4.2.3 NULL DETECTOR CIRCUIT

A contact closure is mounted on the back panel (Figure 1-14) which functions to so indicate when the chamber is approaching the SET point of the temperature controller. At this point the controller will start its anticipation cycle. Also provided at this location are terminals (TB 5) whereby external equipment may be tied into the signal output.

4.2.4 SOLID STATE SWITCHES

Solid state switches are provided for the heater and coolant circuits, insuring years of trouble free operation.

4.3 THE DELTALOOP

The Deltaloop enables the unit to operate in an automatic mode under the control of an integrated circuit test system.

The Deltaloop is an electronic circuit which controls the power to the solenoid (14 on D2633719) which in turn controls the air supplied to the air-actuated valve, causing the transfer block to move to and from the test position. Refer to the System Flow Diagram, figure 3.

4.3.1 The Deltaloop contains two optional circuits which increase the versatility of the Model 8195 Multi-Pack Environmental Handler. These are the Maxi-timer and the Output Photo Detector circuits.

4.3.2 For a detailed description of the Deltaloop, refer to schematic C1634063, and block diagram C1634128.

4.3.3 An insulating (end of test) signal buffer amplifier consists of emitter follower transistors Q5 and Q6, and relay K2. Use of this buffer circuit is optional. The customer must supply power and signal to this circuit, and he must select the proper relay as explained on Deltaloop stuffing sheet C1634032.

4.3.4 The remainder of the circuit is designed around the DTL 800-series devices for standard logic compatibility (5V).

4.4 TRANSFER BLOCK FROM FULL-OUT TO FULL-IN

The one-shot SS-1 (Q2, Q3 and associated components) triggers when a positive going pulse (end-of-test signal) is applied to terminal 1. If the buffered inputs are used, K2 opens up and SS-1 is triggered by the pull-up resistor R4. The inverted signal sets the transfer block memory, which enables one input (D4) of the power nand gate (Q4). If all the other inputs are enabled, K1 is energized and triac Q13 closes. The transfer block goes in.

4.5 TRANSFER BLOCK FROM FULL-IN TO FULL OUT

As the transfer block moved in, it ungrounded the full-in micro-switch, triggering SS-2 (Q7, Q8 and associated components). The inverted signal sets the full-in memory and in return enables one input of A1-1 nand gate. When SS-2 has timed out, gate 2 (D9) is enagled. With both inputs enabled, the transfer block memory resets through A1-1, A2-4, and A3-5.

4.5.1 A third input of A1-1 may be controlled by the Maxi-timer (see Option 1). In this case all three inputs of A1-1 have to be enabled to reset the transfer block memory.

4.6 REPROBE CIRCUIT

If a reprobe command is given either by grounding terminal 8, or ungrounding terminal 9 SS-3 (Q10, Q11 and associated components) it triggers and sets the reprobe memory. The reprobe memory sets the "cycle complete" memory which enables the one input of a nand gate A5-3. When the transfer block passes the half-in microswitch and enables the second input of the nand gate, the output disables the power nand gate through D10 and removes the power from the transfer solenoid. The transfer block returns to the full-out position for re-testing the device. In the full-out position, both the half-in and the "cycle complete" memory will be reset. This enables the power nand gate again, and the next E.O.T. (end-of-test) command allows the transfer block to go into the full-out position. A second reprobe is not possible, because the reprobe memory is still in the set position. Only the full-in micro-switch will reset the reprobe memory. This guaranties that one part can not be reprobed more than one time.

4.7 OPTION 1 THE MAXI-TIMER

The Maxi-timer (B1633965) with a program time of from 500 ms to 20 seconds, may be installed to guaranty the proper soak time.

4.7.1 Each time the transfer block moves into the full-out position, the Maxi-timer will be fired. The output 3 inhibits the transfer block memory from being reset until the Maxi-timer has timed out (see para. 4.5 - Transfer Block from Full-in to Full-out; and Timing Diagram). It is also possible to inhibit the transfer block in the full-out position (C1634032 Note 1).

4.8 OPTION 2 OUTPUT PHOTO DETECTOR

Application of the Output Photo Detector will assure that the transfer block will not be enabled in the full-back position until the device from the previous test has left the output chute.

4.8.1 During soak time, the SS-2 one-shot holds the transfer block in the back position for 250 ms. When the first device passes the Output Photo Detector, the SS-2 is inhibited by the inhibit line A2-1, Pin 2. The full-in memory is set by the photo detector circuit.

5.0 MAINTENANCE

5.1 CONTROLLER CALIBRATION PROCEDURE

Periodic calibration of the controller is not required. But if calibration is necessary, the required equipment to calibrate the controller will be an oscilloscope and a precision resistor substitution box such as a General Radio Co., type 1432-T.

5.2 PREPARATION

Remove the controller module from the front of the chamber or open the side access door (Figure 6-6) to expose the controller.

5.2.1 Remove the probe input leads to the controller. These are the two top terminals on the left hand board looking at the rear of the unit from the back (terminals 1 and 2 of TM1) Notice which wire goes to which terminal so that they can be put back as originally connected. Connect the resistance box between these two terminals.

5.2.2 Connect an oscilloscope to the point shown on the Printed Circuit Board Assembly drawing which is number 1137C-3 (Figure 7). Connect the ground of the scope to any portion of the controller frame.

5.2.3 Plug the chamber power cord into a source of power, turn the HEAT (Figure 5-5) and COOL switches (Figure 5-1), OFF and the POWER switch (Figure 5-4) to ON.

5.2.4 Ensure that the MODE switch (Figure 5-3) is in the MANUAL position.

5.2.5 The location of the SLOPE and OFFSET potentiometers is shown in Figure 7. Adjust the SLOPE (100 ohm) and the OFFSET (20 ohm) trimpots to the center of their range (10 turns from either end).

5.3 CALIBRATION

Verify that the zero adjustment is correct. To do this, set the digital set point to -000.0°C and set the resistance box until a null is obtained on the oscilloscope. Now set the set point to +000.0°C and adjust the 10 ohm zero trimpot R31 (located on the resistor mounting board) until a null is arrived at on the oscilloscope.

5.3.1 Set the TEMPERATURE SET dial to +150.0°C and select 297.9 ohms on the resistance box. Adjust the SLOPE trimpot until a null is obtained on the oscilloscope.

5.3.2 Set the TEMPERATURE SET dial to -073.0°C and set the resistance box to 123.9 ohms. Adjust the OFFSET trimpot until a null occurs on the oscilloscope. NOTE: The LOWER temperature adjustment is made on the LOWER RESISTANCE (20 ohms) and the HIGHEST temperature adjustment is made on the HIGHEST RESISTANCE (100 ohm) trimpot. Alternately adjust the 150°C and -73°C points until the TEMPERATURE SET dial point is correct at both temperatures. Turn off and disconnect power, remove the test equipment and reconnect the probe wires to the rear of the controller.

5.4 GENERAL

Assembly drawings are included with this manual for ease of part identification should the Model 8195 require replacement parts. Parts that should be inspected during routine preventative maintenance include all moving parts such as air cylinders and cam followers.

5.5 PNEUMATIC AIR CYLINDER ASSEMBLY

The air pressure gage of the Model 8195 is located behind the access door on the right side of the equipment (Figure 6). Delta recommends the regulator be set to read 80 lbs., of air pressure by adjustment of the screw coming out of the top of the air regulator assembly. The two glass filters also should be observed daily to see that no water is present and that oil is present in the proper glass. NOTE: See appendix "Installation and Service Instructions", for proper preparation and care of MINI-LINE filter, regulator and lubricator.

5.6 TRANSFER MECHANISM - Change-over Adjustments and Parts Applicable to Handle the 029 or 039 Series Carriers.

Figure 11 shows the areas of the mechanism effected and a chart of the parts to use for any particular carrier.

Refer to drawing E2633793 for a complete assembly and parts list of the transfer mechanism.

5.6.1 The change-over may be made without removing the Transfer Mechanism.

5.6.2 First remove the baffle (see para. 7.2 and Figure 8).

5.6.3 Refer to Figure 11, Page 55 and proceed as follows:

(a) Remove ramps item 7 if required.
(b) Remove drop-cams item 4 (The drop-cam bridge may be removed to facilitate the change-over).
(c) Remove adapter chute item 2 and brackets item 3.
(d) Remove transfer chute item 1.
(e) Adjust upper and lower stop fingers per instructions in figure 11.
(f) Add or remove transfer support (s) as required.
(g) Reverse the procedure to install the proper posts for the carrier to be handled. Replace the shroud.

6.0 CLEANING

Any commercial solvent or detergent may be used. Freon-TF is recommended. Remove dust particles with low velocity compressed air.

7.0 REMOVAL OF THE HANDLING MECHANISM

Refer to Figure 8.

7.1 Release the chamber door and remove it.

7.2 The Air Baffle 14 can be removed from around the mechanism by taking out the three knurled screws 15. By moving the Air Baffle straight back, then compressing the two sides inward slightly, the unit can be removed from behind the mechanism and out through the door opening.

7.3 Remove screw 16 from the back of the Input Chute 17, and the screw 18 from the back of the Output Chute. These screws are size 10-32.

7.4 Remove the two screws in the temperature probe bracket which hold the probe to the bracket. This will allow the probe to be removed from the part of the bracket which is mounted to the assembly.

7.5 Open the door to the electrical/pneumatic compartment on the R.H. side of the unit and loosen screw 23 in the coupling. There are two screws in the coupling. Loosen the one nearest the partition only.

7.6 Taking out the four knurled screws 19 will allow the Output Chute 20 to be removed.

7.7 Remove the four screws 21 from the base plate.

7.8 Now the mechanism may be moved directly toward the door opening to dis-engage the coupling 22 and to clear the inner wall. Remove mechanism through the door opening.

7.9 Reverse the procedure to install the mechanism.

8.0 DIS-ASSEMBLY

Reference is made to the assembly drawing E2633793 which shows all parts comprising the Model 8195 Handler mechanical sssembly.

9.0 REPAIR AND REPLACEMENT

Dis-assemble, clean, and inspect the Handler parts and re-assemble as shown in the assembly drawings.

10.0 TESTING

Testing the Model 8195 will best be accomplished by processing semiconductor devices through the equipment with the proper test contactor assembly in place. Feeding of parts into the input chute may be accomplished by magazine feed or manually feeding one part at a time. Verification of contact continuity and proper processing with no "hang up", of devices in carriers indicates the equipment is ready for production.

11.0 TROUBLE SHOOTING

11.1 THE CONTROLLER

The following factors aid the trouble shooting procedures greatly. (1) The red HEAT lamp is connected across the controller heat output. A brightly glowing RED lamp is an indication that the heaters are energized. (2) The green COOL lamp is connected directly across the coolant valve solenoid and when glowing brightly, indicates power applied to the solenoid. (3) Turning the MODE switch to PROGRAM, with the safety plug connected, should extinguish both the HEAT and COOL lamps.

The forms and DC voltages are shown on the Printed Circuit Assembly Schematic, Drawing Number 1137D-3 (Figure 9) and should be checked for difficult cases.

11.2 THE DELTALOOP

Refer to Figure 10 for signal phase relationship of the Deltaloop to automatic handling equipment. The Deltaloop is an electronic circuit which controls the power to the solenoid (Sol. L4 on D2633719) which in turn controls the air supplied to the air actuated valve causing the transfer block to move to and from the test position.

The Deltaloop enables the Model 8195 to operate in an automatic mode under the control of an integrated circuit test system. Refer to schematic C1634063.

11.3 END OF TEST

A normally closed circuit, which the customer must connect between common (terminal 6, 11 or 16) and terminal #1, will actuate the transfer when it is opened. If the customer's equipment can not furnish a contact closure, he may use a built-in buffer amplifier and reed relay circuit (terminals 2, 3 and 4). The correct reed relay must be selected and plugged into pin sockets on the P.C. Board provided for this purpose. The customer must provide B (+) to terminal 2, B (-) to terminal 3, and the signal to terminal 4. The relay may be plugged-in in one of two ways, depending upon the sense of the signal. The relay must be plugged in so that it opens (de-energizes) when the transfer is to operate. Terminal #1 must be ungrounded when the input buffer is used.

11.4 RE-PROBE

A device may test bad because of poor contact between device leads and contactor. The Deltaloop may be programmed to briefly withdraw the device a short distance from the contactor and then re-insert the same device for a second test. After one re-probe cycle this function will not repeat, instead, the transfer will go in all the way to pick up a new device. To initiate a re-probe cycle, momentarily ground terminal 8 (no connection on terminal 9) before applying the end of test signal. The re-probe circuit may also be preset by ungrounding terminal 9 with terminal 8 permanently grounded.

11.5 INHIBITS

The Deltaloop may receive an "end of test" signal yet be inhibited from actuating the transfer by grounding terminal 14, or by ungrounding terminal 14 or by ungrounding terminal 13, or both. To operate

normally, terminal 13 must be grounded, and terminal 14 must be open. The transfer will operate the instant the inhibit is removed.

11.6 ELECTRONICS CIRCUITS

The electronic circuitry of the Model 8195 consists of the following basic components. Refer to Schematic D2633718.

11.6.1 A "ready to test" microswitch.

11.6.2 A "half-in" microswitch (needed for re-probe function only).

11.6.3 A "full-in" microswitch.

11.6.4 An electrical solenoid air valve.

11.6.5 An electronic package containing the "Deltaloop" circuit assembly.

11.7 FUNCTIONS OF BASIC COMPONENTS

The "ready to test" microswitch operates when a device is in the test contactor (full-out). The customer may connect this switch to his equipment to initiate the test cycle. A small delay may have to be provided because this switch trips approximately 90 milliseconds before the transfer has come to a full stop at the test contactor.

11.7.1 The "half-in" microswitch is connected to the Deltaloop to initiate return of the transfer in mid-stroke for re-probing the same device a second time. This is a feature which gives a device, which may have failed the first test due to poor contact, a second chance.

11.7.2 The "full-in" microswitch signals the Deltaloop that the transfer is near the device pick-up and drop position (full-in).

11.7.3 The Deltaloop electronics package consists basically of a printed circuit board assembly, which provides the following functions.

11.7.3.1 It receives and stores an "end of test" signal, actuating the transfer, unless inhibited.

11.7.3.2 It monitors inhibiting signals, which may inhibit the transfer.

11.7.4.3 When actuated, it holds the transfer at the full-in position for a fixed amount of time (approximately 150 milliseconds) to allow parts to leave and enter the transfer block.

11.7.3.4 When equipped with the "device out" detector, the waiting time of 150 milliseconds described in 11.7.3.3 is overridden by the tested device leaving the transfer block.

11.7.3.5 When equipped with the programmable "MAXI-TIMER" it holds the transfer block in either the full-out or the full-in position for a period of 20 seconds maximum.

11.7.3.6 It applies power to the solenoid valve through a low RFI solid state switch.

11.7.3.7 It re-probes a device one time if it receives a re-probe signal while the transfer is at the test contactor.

11.7.4 INITIAL TESTS

CAUTION

120 VAC power is present on the Deltaloop P.C. Board at and near the triac Q9 (large heat sink). Use extreme care in making electrical tests since short circuits may cause substantial damage.

11.7.5 Initial tests are made for: (a) 120 VAC between strip terminals 19 and 20, (b) 12 VDC ± 2V at output of the supply, (c) terminal 2 measured with respect to the common terminals 9, 10, or 11.

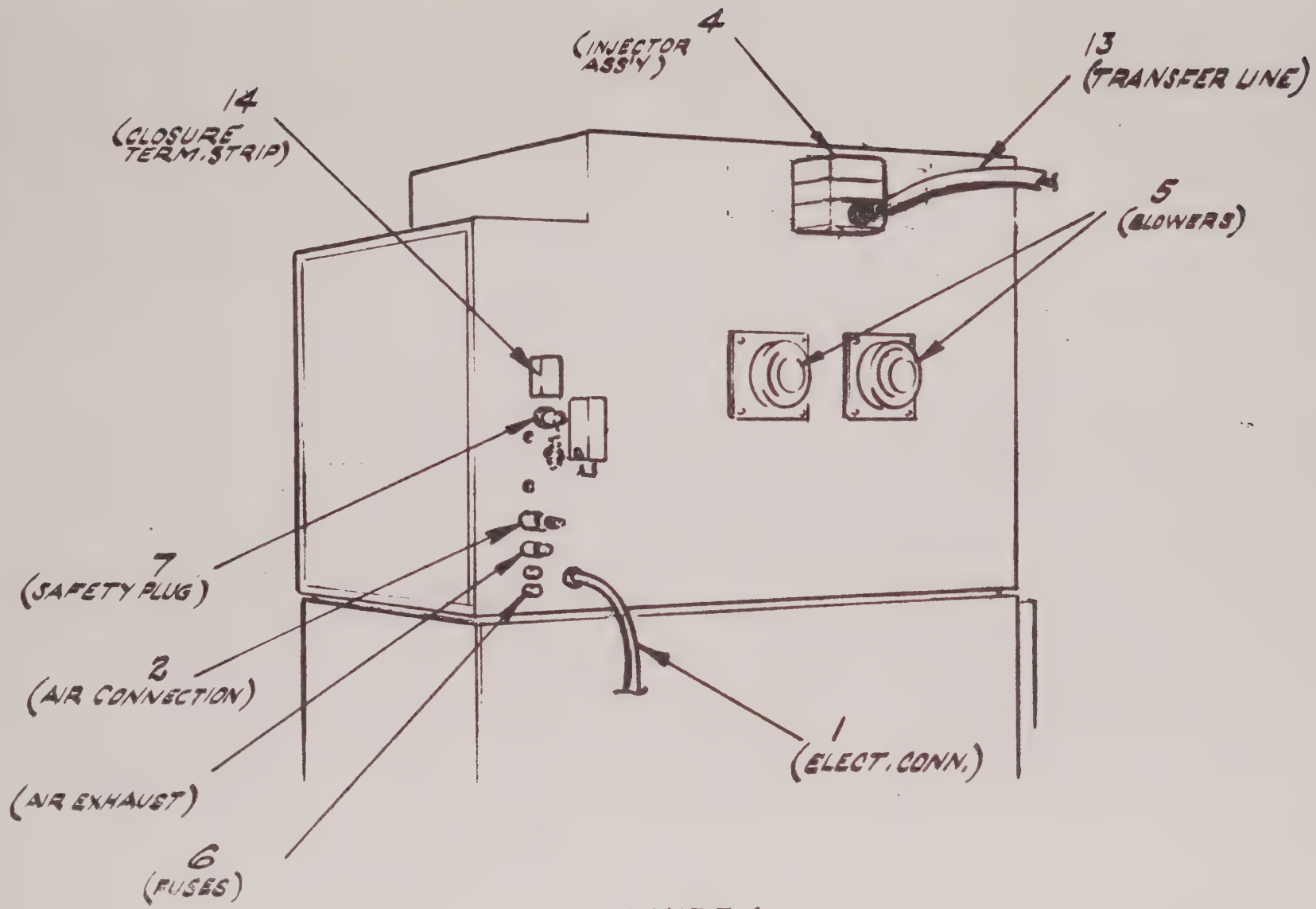
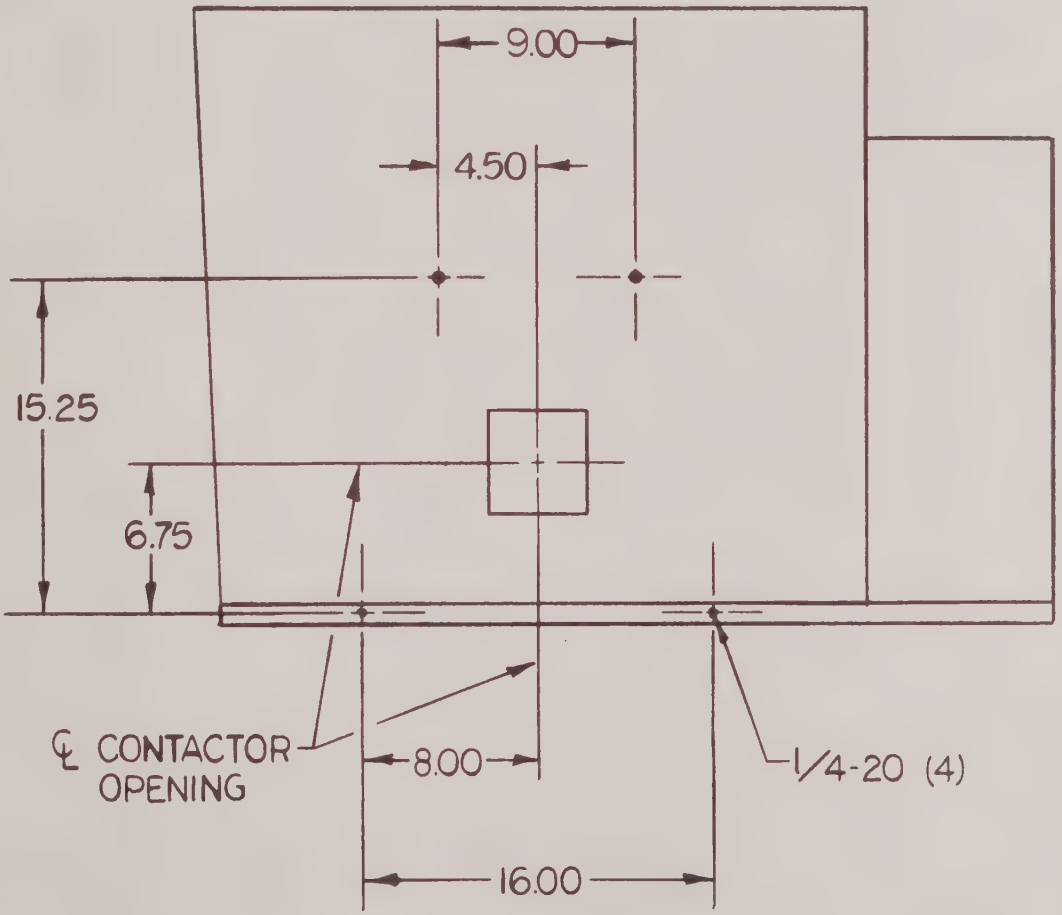


FIGURE 1

BACK PANEL



HIGH FREQUENCY TESTER ADAPTATION

FIGURE 2

DELTA DESIGN INC.

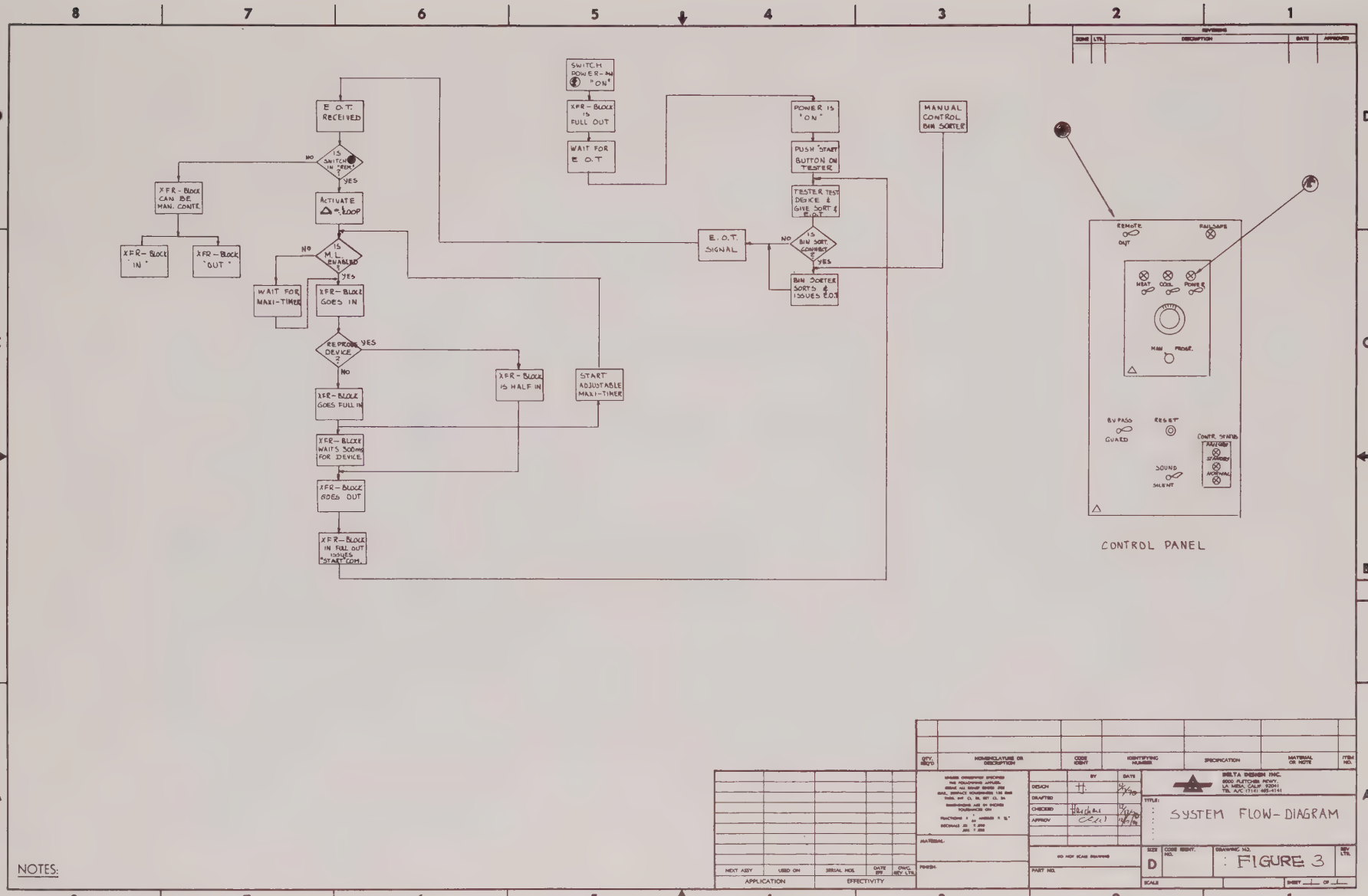

E.O.T. RECEIVED
IS SWITCH IN "REM"?
NO
YES
XFR-BLOCK CAN BE MAN. CONTR.
XFR-BLOCK "IN"
XFR-BLOCK "OUT"
ACTUATE Δ = LOOP
IS M.L. ENABLED?
NO
YES
WAIT FOR MAXI-TIMER
XFR-BLOCK GOES IN
REPROG. DEVICE?
YES
NO
XFR-BLOCK GOES FULL IN
XFR-BLOCK IS HALF IN
START ADJUSTABLE MAXI-TIMER
XFR-BLOCK WAITS SOME FOR DEVICE
XFR-BLOCK GOES OUT
XFR-BLOCK IN FULL OUT ISSUES "START COM."
SWITCH POWER-SW "ON"
XFR-BLOCK IS FULL OUT
WAIT FOR E.O.T.
POWER IS "ON"
PUSH "START" BUTTON ON TESTER
TESTER TEST DEVICE & GIVE SORT & E.O.T.
IS BIN SORT. CORRECT?
NO
YES
BIN SORTER SORTS & ISSUES E.O.T.
E.O.T. SIGNAL
MANUAL CONTROL BIN SORTER
REMOTE OUT
FAILSAFE
HEAT
COOL
POWER
MAN. PROBE
BYPASS GUARD
RESET
CONTR. STATUS
ALARM
STANDBY
NORMAL
SOUND SILENT
CONTROL PANEL
NOTES:
DELTA DESIGN INC.
SYSTEM FLOW-DIAGRAM
SIZE D
DRAWING NO. FIGURE 3

FIGURE 3

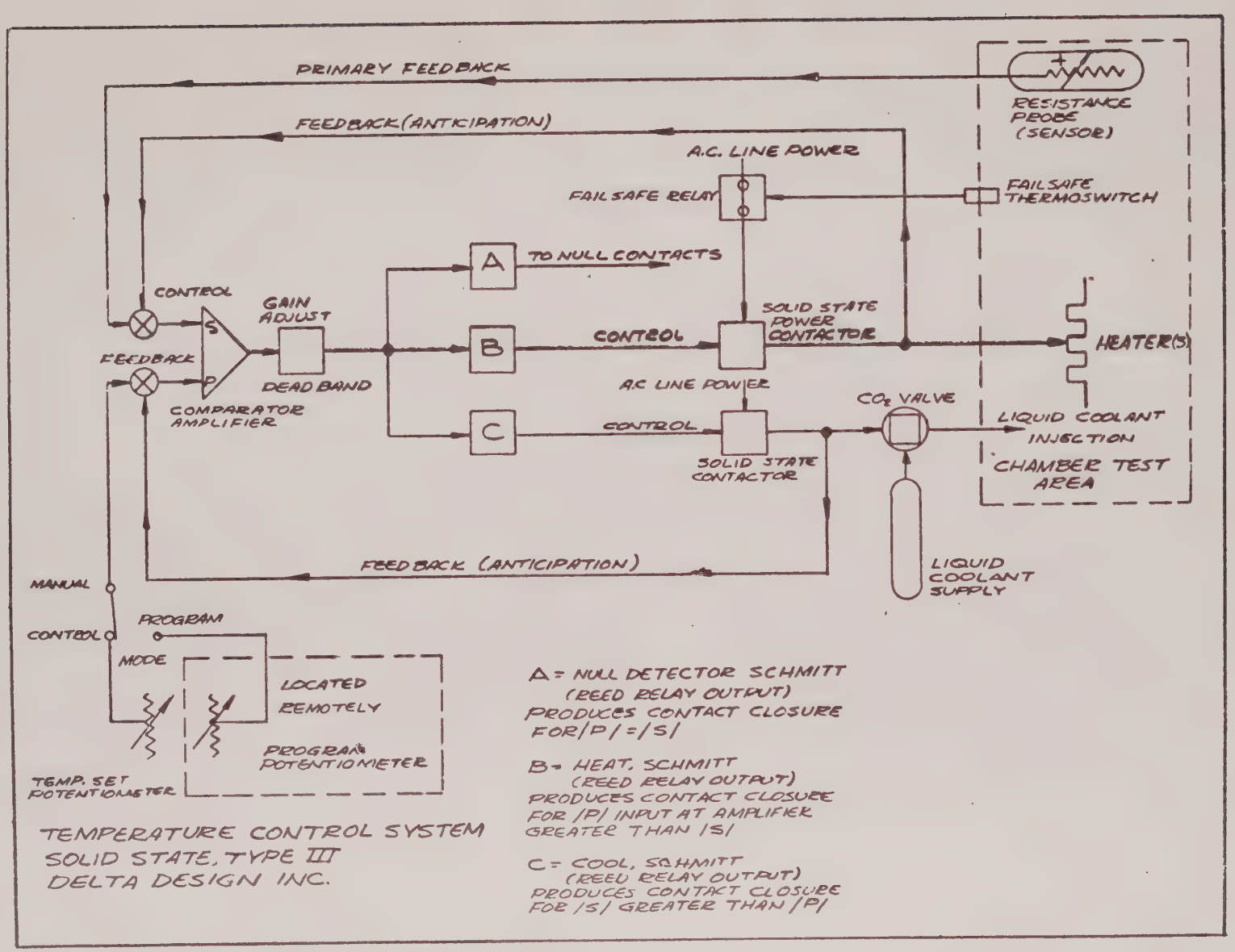

PRIMARY FEEDBACK
RESISTANCE PROBE (SENSOR)
FEEDBACK (ANTICIPATION)
A.C. LINE POWER
FAIL SAFE RELAY
FAIL SAFE THERMOSWITCH
A
TO NULL CONTACTS
CONTROL
GAIN ADJUST
S
FEEDBACK
P
B
CONTROL
SOLID STATE POWER CONTACTOR
HEATER(S)
DEAD BAND
A.C. LINE POWER
COMPARATOR AMPLIFIER
CO_2 VALVE
C
CONTROL
LIQUID COOLANT INJECTION
SOLID STATE CONTACTOR
CHAMBER TEST AREA
FEEDBACK (ANTICIPATION)
LIQUID COOLANT SUPPLY
MANUAL
CONTROL
PROGRAM
MODE
LOCATED REMOTELY
PROGRAM POTENTIOMETER
TEMP. SET POTENTIOMETER
TEMPERATURE CONTROL SYSTEM
SOLID STATE, TYPE III
DELTA DESIGN INC.
A = NULL DETECTOR SCHMITT (REED RELAY OUTPUT) PRODUCES CONTACT CLOSURE FOR /P/ = /S/
B = HEAT, SCHMITT (REED RELAY OUTPUT) PRODUCES CONTACT CLOSURE FOR /P/ INPUT AT AMPLIFIER GREATER THAN /S/
C = COOL, SCHMITT (REED RELAY OUTPUT) PRODUCES CONTACT CLOSURE FOR /S/ GREATER THAN /P/

FIGURE 4

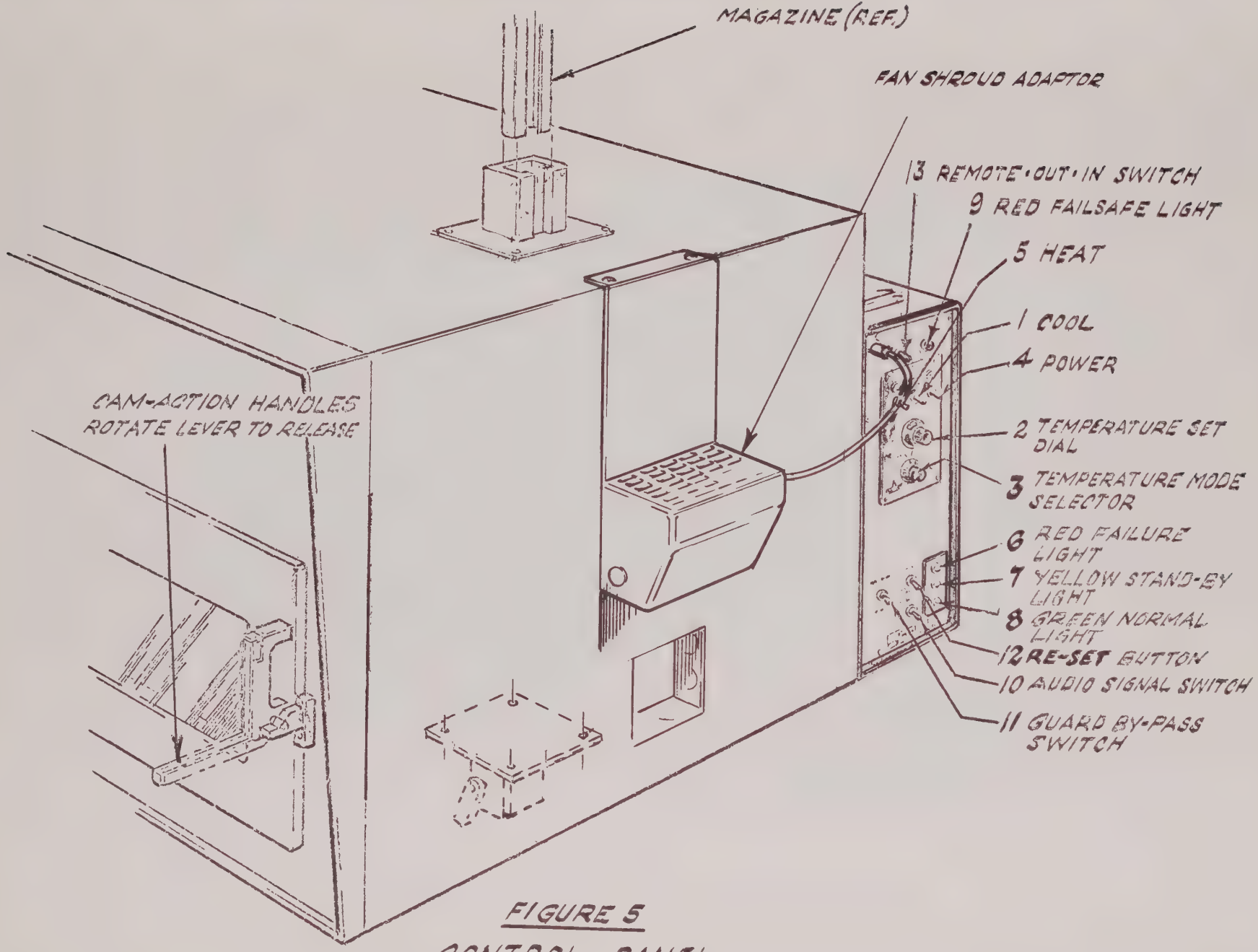


FIGURE 5
CONTROL PANEL

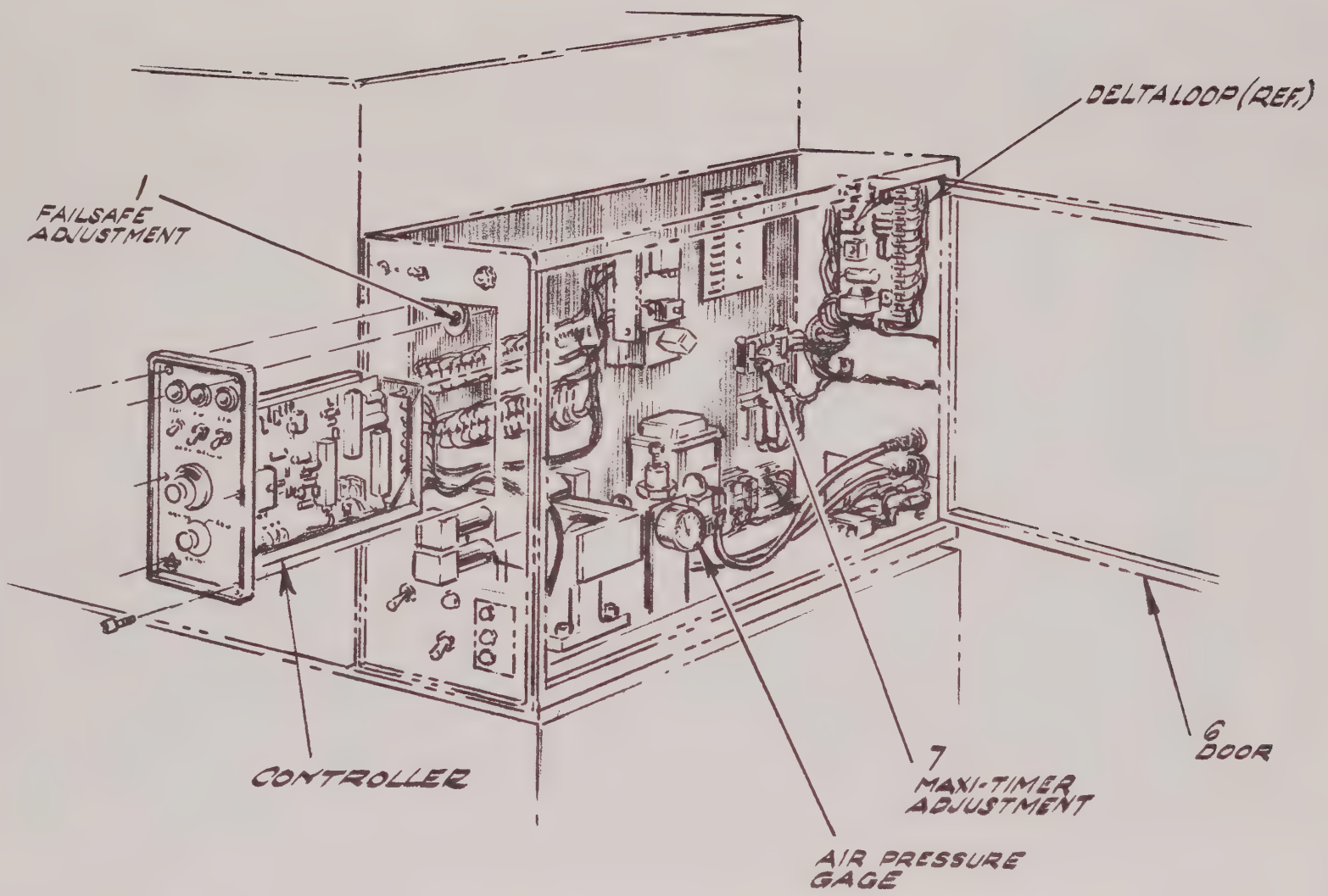
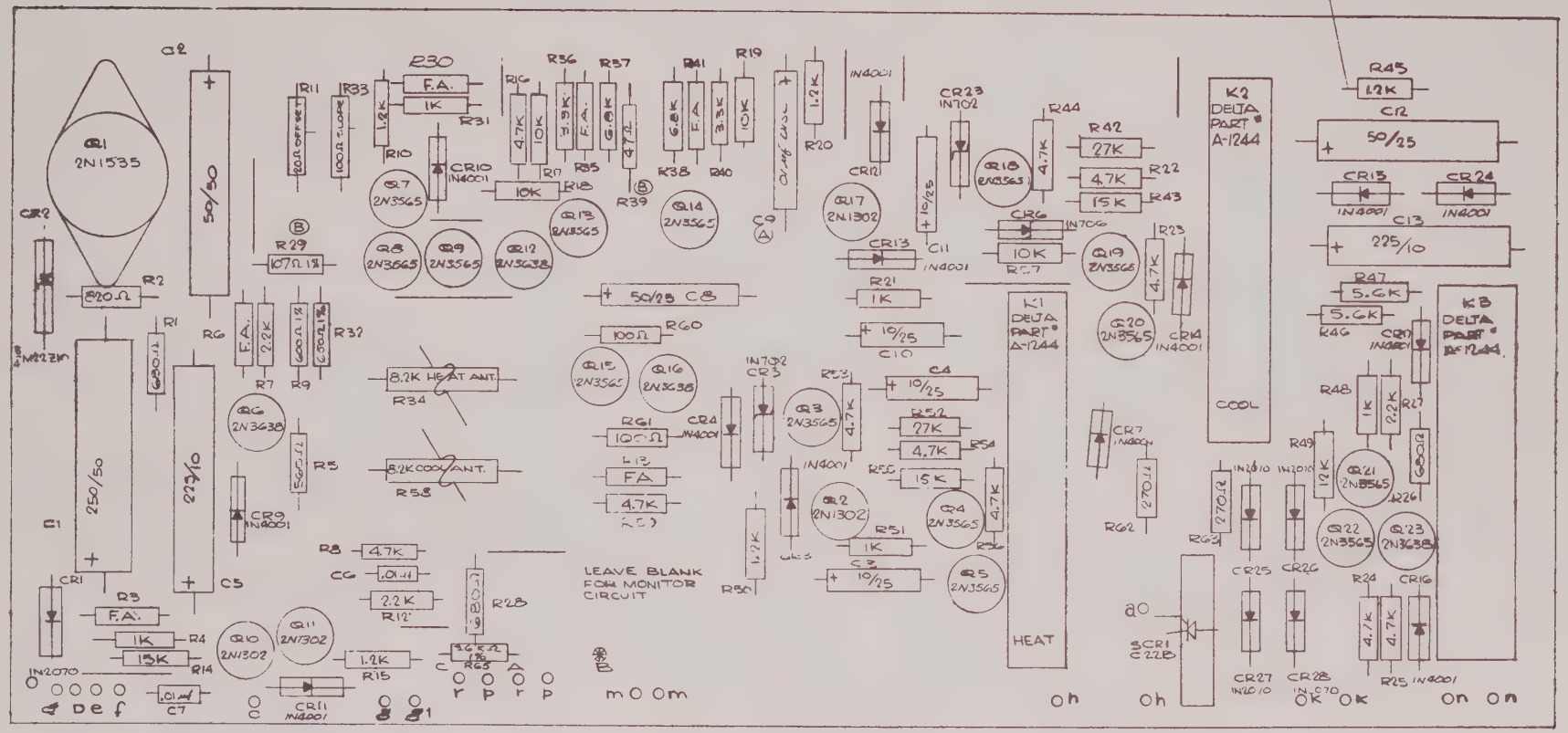


FIGURE 6

ELECTRICAL-PNEUMATIC COMPARTMENT

A	C9 WAS 50/25	NOW IS .01 mf DISC
	SERIAL NOS.	A1172 - 5202 & ON A-1140 - 5264 & ON A-1122-1-5479 & ON
B	R29 WAS 118Ω CR19, 20, 21 & 22 DELETED TERMINALS C, C, C, C DELETED R39, 500Ω TRIMPOT DELETED	A-1172-5202 & ON A-1140-5264 & ON A-1122-6800 & ON
C	CHANGED R39 TO A 47Ω C.C ½W 5%	10/17/68
D	CHANGED R43 TO 15K FROM 18K R55 TO 15K FROM 18K	

ATTACH SCOPE HERE TO MONITOR NULL WHEN CALIBRATING. (CONNECT SCOPE GND TO CHASSIS GROUND)



PARTS LAYOUT PRINTED CIRCUIT BOARD ASS'Y.
DELTA DESIGN INC. PART NO. A-1098

SERIAL NO 5223 & ON SHT: 2 OF 2

3/24/64 RSH
A
4/27/64
PARTS LAYOUT FOR P.C. BOARD ASS'Y A1098
1187C-3M

FIGURE 7

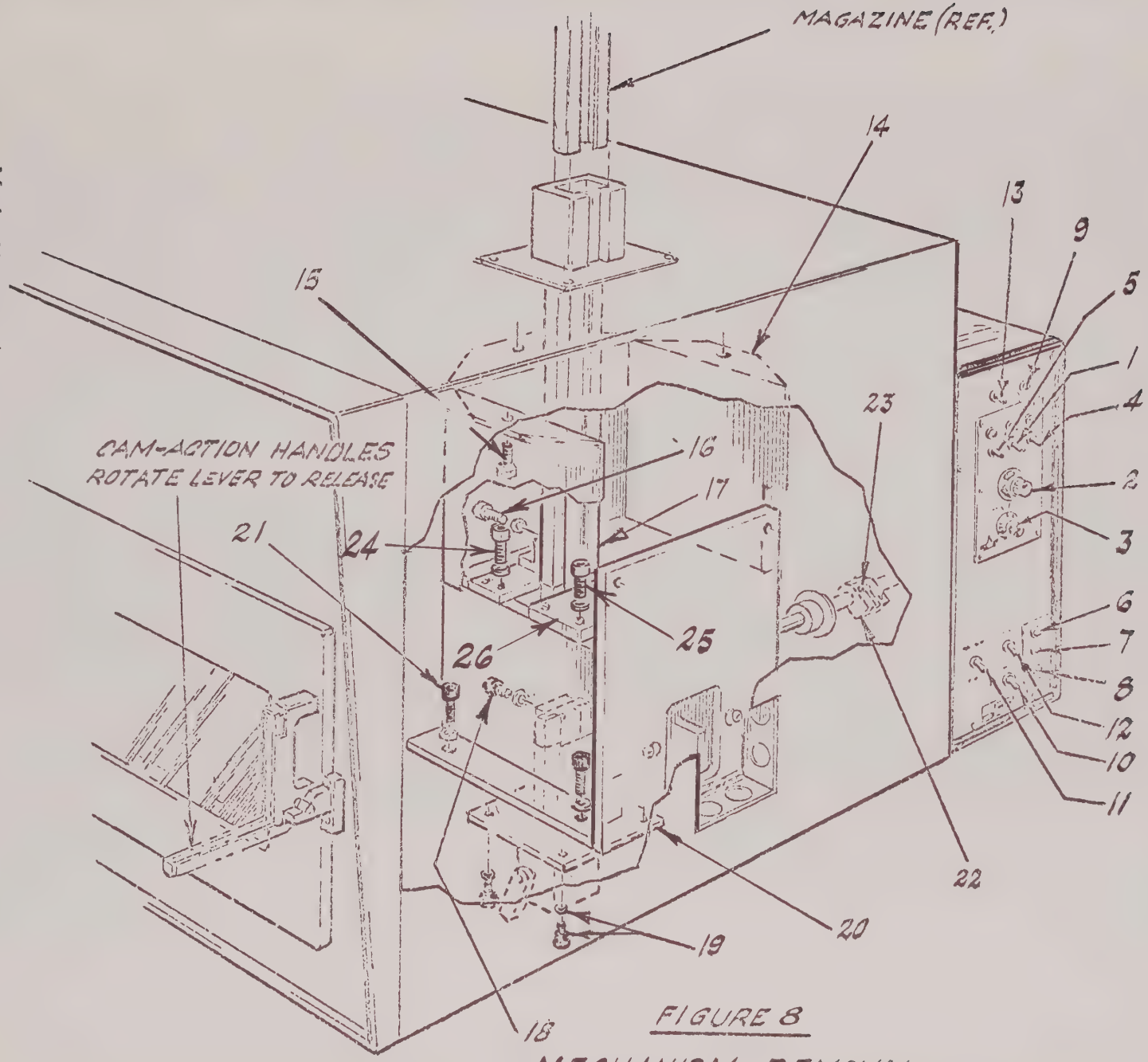


FIGURE 8

MECHANISM REMOVAL

MCO. 8194 0471

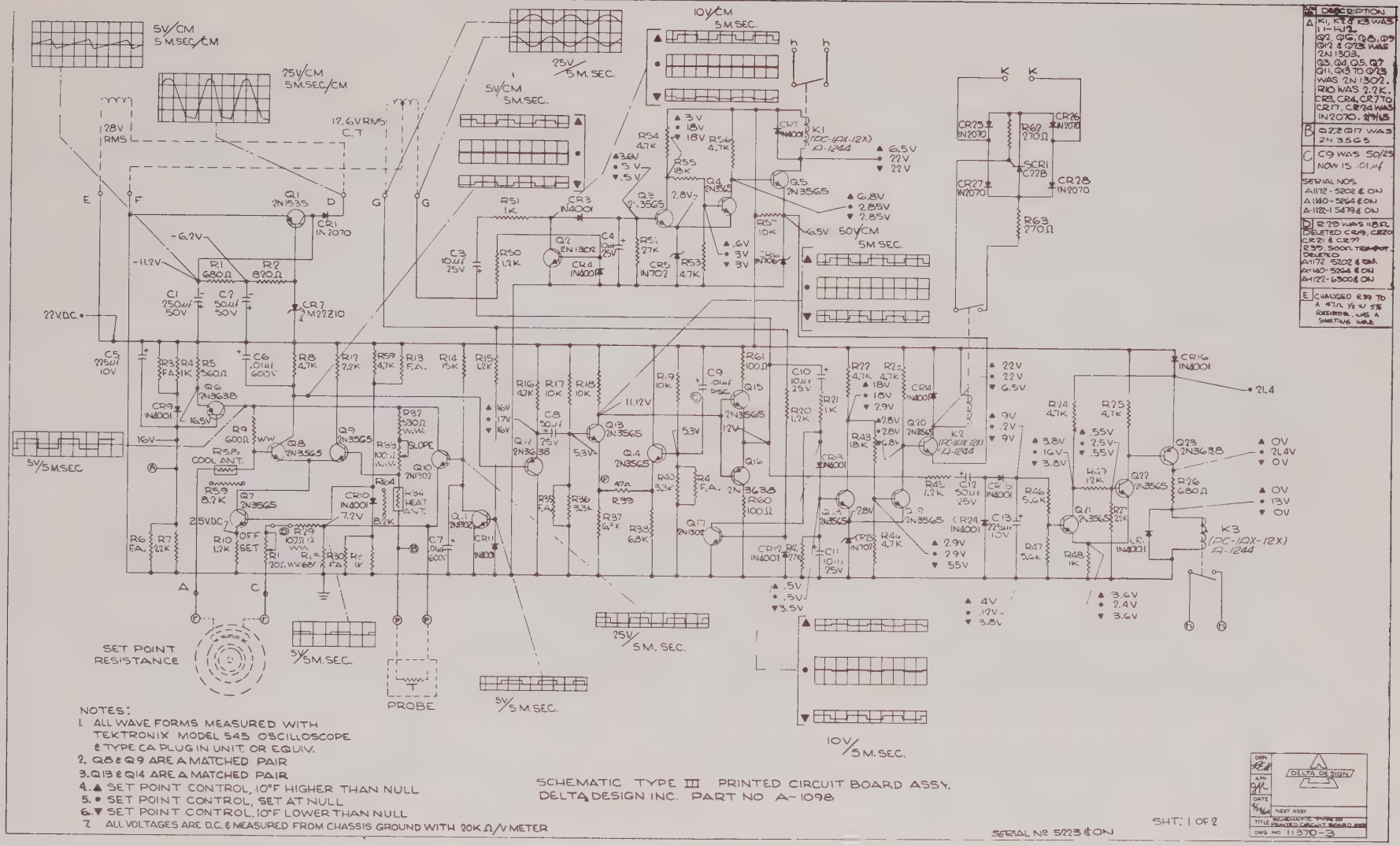
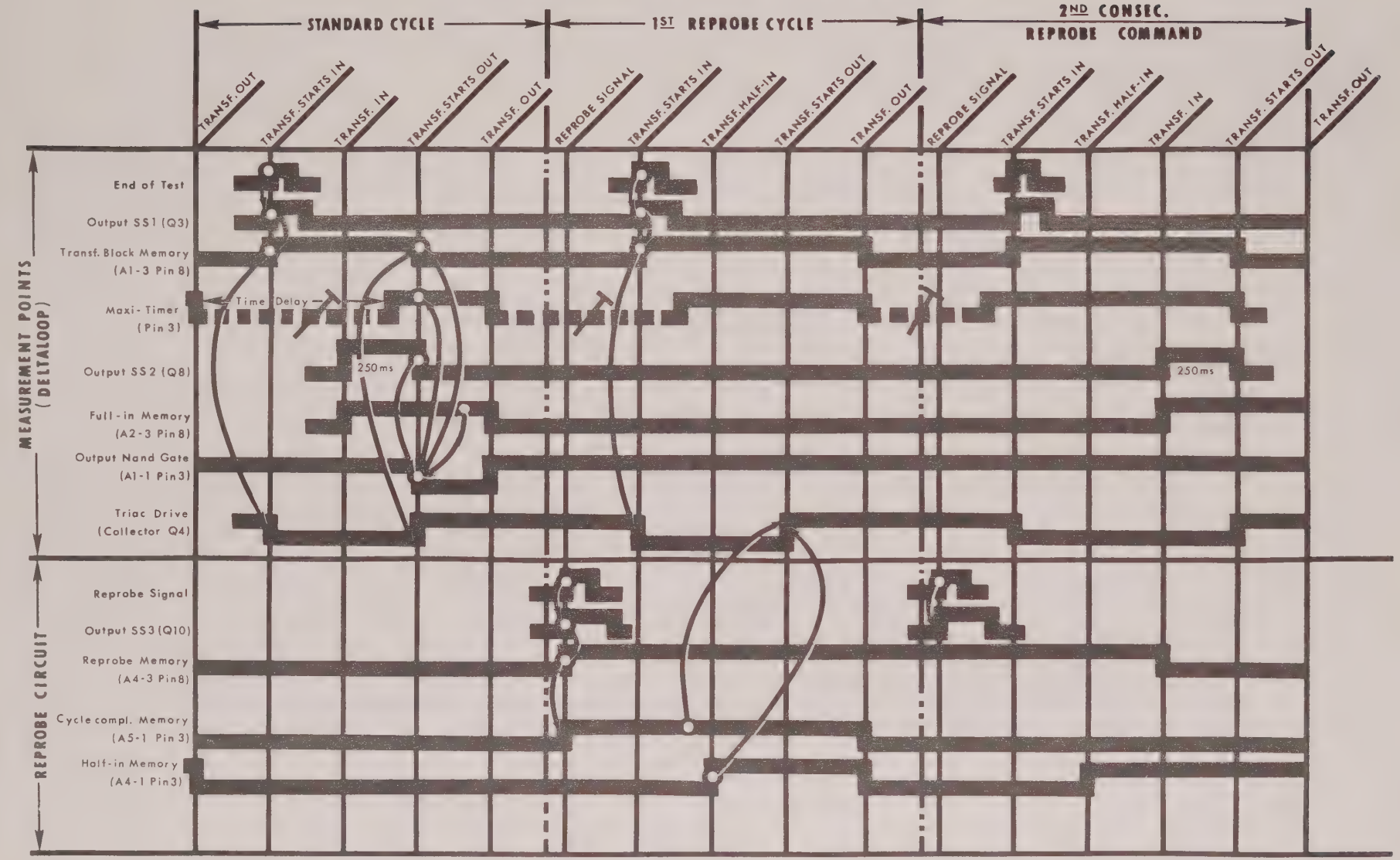

5V/CM
5 M.SEC/CM
25V/CM
5M.SEC/CM
28V
RMS
12.6V RMS
C.T
10V/CM
5 M.SEC.
25V
5 M. SEC.
5V/CM
5M.SEC.
-6.2V
-11.2V
22V.DC.
25V.DC.
16V
5V/5M.SEC
SET POINT
RESISTANCE
PROBE
5V/5M.SEC
25V/5 M. SEC.
10V/5M.SEC.
K1
(DC-12X-12X)
A-1244
K2
(DC-12X-12X)
A-1244
K3
(PC-12X-12X)
A-1244
SCR1
C22B
6.5V 50V/CM
5M SEC.
DESCRIPTION
A K1, K2 & K3 WAS 1-KH2. Q2, Q6, Q8, Q9 Q12 & Q23 WAS 2N1303. Q3, Q4, Q5, Q7 Q11, Q13 TO Q18 WAS 2N1302. R10 WAS 2.2K. CR3, CR4, CR7 TO CR17, CR24 WAS IN2070. 8/9/68
B Q22 Q17 WAS 2N3565
C C9 WAS 50/25 NOW IS .01μf
SERIAL NOS. A1172 - 5202 & ON A1160 - 5264 & ON A-1122-1547 & ON
D R29 WAS 11.8Ω. DELETED CR19, CR20 CR21 & CR29 R39, 500Ω TRIMPOT DELETED A1172 5202 & ON A-1160- 5264 & ON A-1122- 6300 & ON
E CHANGED R39 TO A 47Ω ½ W 5% RESISTOR. WAS A SUBSTITUTE VALUE
NOTES:
1. ALL WAVE FORMS MEASURED WITH TEKTRONIX MODEL 545 OSCILLOSCOPE & TYPE CA PLUG IN UNIT, OR EQUIV.
2. Q8 & Q9 ARE A MATCHED PAIR
3. Q13 & Q14 ARE A MATCHED PAIR
4. ▲ SET POINT CONTROL, 10°F HIGHER THAN NULL
5. • SET POINT CONTROL, SET AT NULL
6. ▼ SET POINT CONTROL, 10°F LOWER THAN NULL
7. ALL VOLTAGES ARE D.C. & MEASURED FROM CHASSIS GROUND WITH 20K Ω/V METER
SCHEMATIC TYPE III PRINTED CIRCUIT BOARD ASSY.
DELTA DESIGN INC. PART NO A-1098
SERIAL Nº 5223 & ON
SHT: 1 OF 2
DELTA DESIGN
NEXT ASSY
SCHEMATIC TYPE III PRINTED CIRCUIT BOARD ASSY
DWG NO 11370-3

FIGURE 9

SIGNAL PHASE RELATIONSHIP - DELTALOOP TO AUTOMATIC HANDLING EQUIPMENT



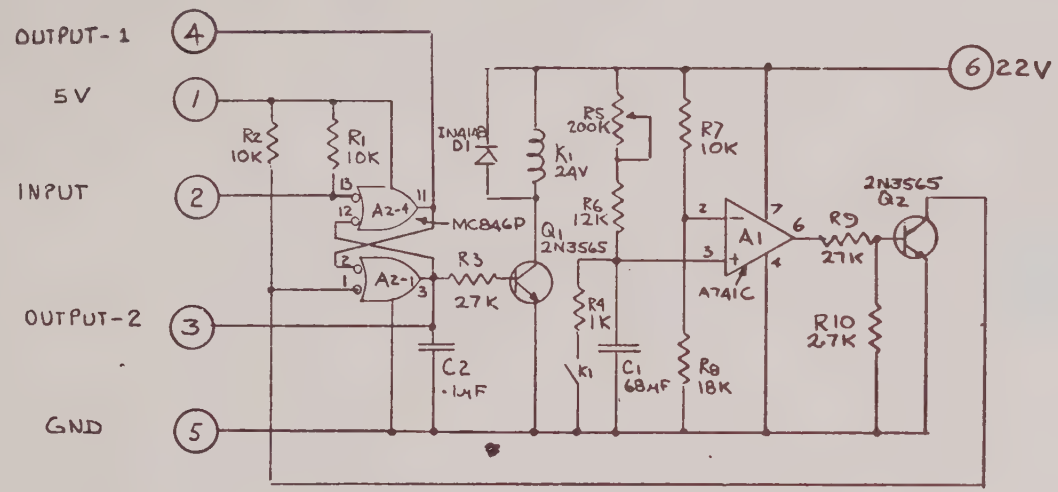
Note: (1) Arrows show sequence of signals

(2) Signals are related in time and level (high or low) only.

FIGURE 10

030871

REVISIONS				
ZONE	LTR.	DESCRIPTION	DATE	APPROVED
	A	ADDED COMPONENT VALUES TO SCHM	2/9/71	H.



QTY. REQ'D	NOMENCLATURE OR DESCRIPTION	CODE IDENT.	IDENTIFYING NUMBER	SPECIFICATION	MATERIAL OR NOTE	ITEM NO

NOTES:

NEXT ASSY.	USED ON	SERIAL NOS.	DATE EFF.	DWG. REV. LTR.

APPLICATION | EFFECTIVITY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS DECIMALS ANGLES
± 1/64 .XX ±.010 ± ½
.XXX ±.005

MATERIAL:

FINISH:

PART NO.

	BY	DATE
DESIGN		12-14-70
DRAFTED		
CHECKED		12-14-70
APPROV.	CEW	12/15/70

DELTA DESIGN INC.
8000 FLETCHER PKWY.
LA MESA, CALIF. 92041
TEL: A/C (714) 465-4141

TITLE: MAXI-TIMER

SIZE	CODE IDENT. NO.	DRAWING NO.	REV LTR
B		B1633965	A

SCALE | SHEET 1 OF 1

DELTA DESIGN, INC.
8000 FLETCHER PKWY.
LA MESA, CALIF. 92041
TEL. (714) 465-4141

	By	Date
Drafted		
Pilot Run App'd.		
Production App'd.		

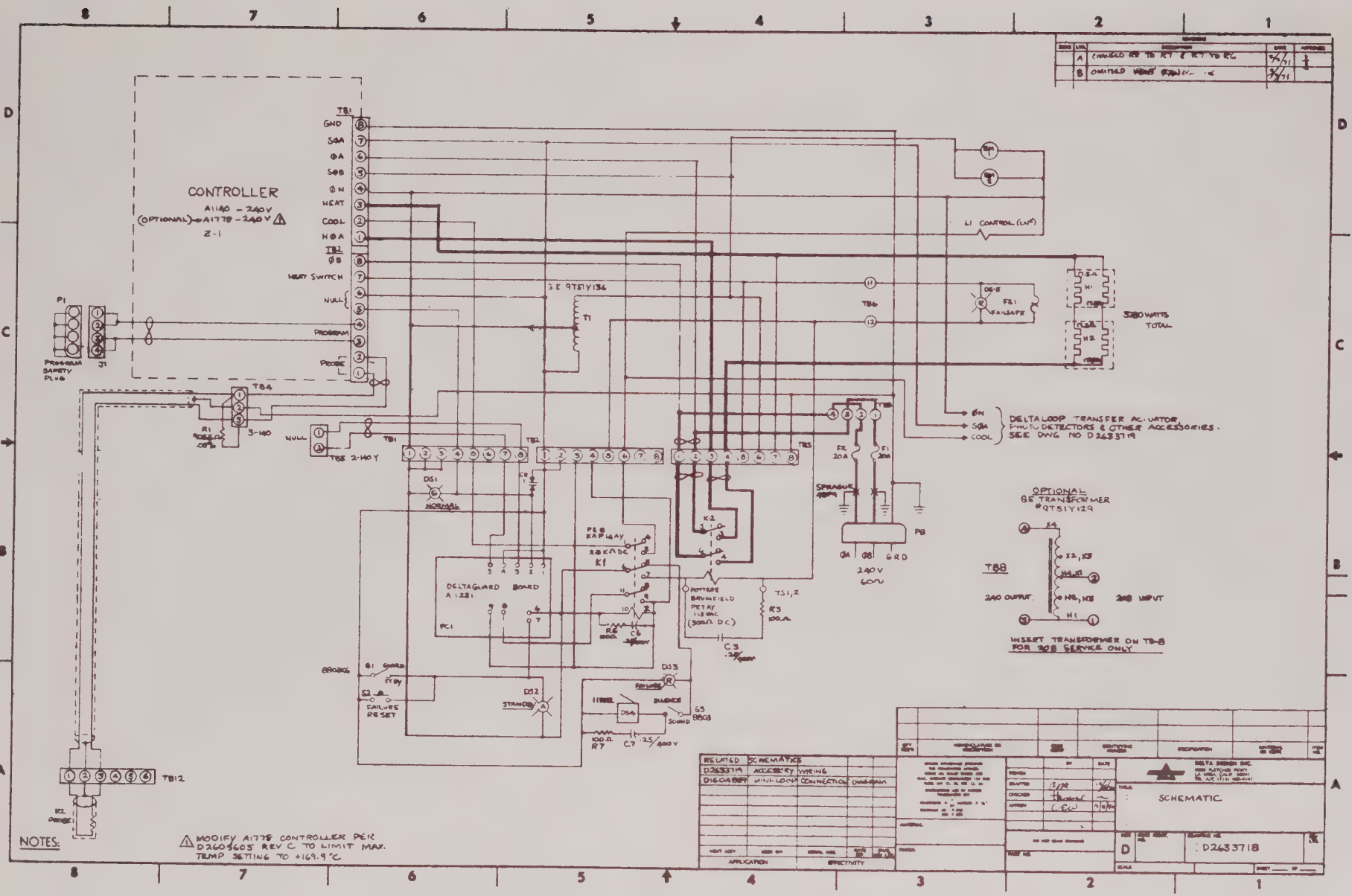
Parts List P2633996 | Rev. | Sheet 1 of 1

Description: P.C. BOARD ASSEMBLY FOR MAXI TIMER

Next Ass'y. Parts List

Item	Qty.	Drawing Number	Description	Manufacturer and Part No.	Stock No.	Fab. Code
01	1	C2633996	P.C. BOARD ASSEMBLY			
02	1		CAPACITOR C1 68μ F	KEMET	0706800015	
03	2		RESISTOR 470 OHM 1/2W 5% R1,R2		0347000500	
04	1		RESISTOR 47K OHM 1/2W 5% R3		0304730500	
05	1		RESISTOR 100 OHM 1/2W 5% R4		0310000500	
06	1		RESISTOR 4.7K OHM 1/2W 5% R6		0304720500	
07	1		RESISTOR 10K OHM 1/2W 5% R7		0301030500	
08	1		RESISTOR 15K OHM 1/2W 5% R8		0301530500	
09	1		RESISTOR 33K OHM 1/2W 5% R9		0303330500	
10	2		TRANSISTOR Q1, Q2	FAIRCHILD 2N3565	1203565	
11	1		LIC AMPLIFIER A1 μA 741	ADVANCED MICRO DEVICES	1000009	
12	1		DUAL 2-INPUT NAND GATE A2	AMELCO 326CJ	1000008	
13	1		TRIMPOT 200K	ELECTRA/MIDLAND	0500044	

Rev.	Date	App'd.	Revision Description


CONTROLLER
A1140 - 240V
(OPTIONAL) A1178 - 240V ⚠
Z-1
TB1
GND
SOA
ΦA
SOB
ΦB
HEAT
COOL
NΦA
TB2
ΦB
HEAT SWITCH
NULL
PROGRAM
PROBE
P1
PROGRAM SAFETY PLUG
J1
TB4
R1 PROBE OPT.
3-140
NULL
TB5 2-140Y
GE 9T51Y134
T1
TB6
11
12
DS-S
FS1 FAILSAFE
5280 WATTS TOTAL
LI CONTROL (LAT)
ΦN
SOA
COOL
DELTALOOP TRANSFER ACTUATOR PHOTO DETECTORS & OTHER ACCESSORIES. SEE DWG NO D2633719
TB1
TB2
TB3
DS1
NORMAL
CR
K2
K1
FS1 20A
FS2 20A
SPRAGUE
P8
ΦA
ΦB
GRD
240V 60~
OPTIONAL GE TRANSFORMER #9T51Y129
TB8
240 OUTPUT
208 INPUT
H4, H5
H3
H2, H3
H1
INSERT TRANSFORMER ON TB-8 FOR 208 SERVICE ONLY
P&B KAP14AY
24KADC
K1
DELTAGUARD BOARD A1281
PC1
R5
C6
ROTHERE BRUMFIELD RELAY 115VAC (30Ω DC)
TS1,2
R3 100Ω
C3 .25
BRIDGE
S1 SHED STBY
S2 FAILURE RESET
DS2 STANDBY
DS3 FAILURE
DS4 BUZZER
S3 SOUND
R7 100Ω
C7 .25/400V
TB12
FS2 PROBE
NOTES:
⚠ MODIFY A1178 CONTROLLER PER D2605605 REV C TO LIMIT MAX. TEMP SETTING TO +169.9°C
A MODIFIED TO RT & RT TO RC
B OMITTED
RELATED SCHEMATICS
D2633719 ACCESSORY WIRING
D16488P MINI-LOOP CONNECTION DIAGRAM
APPLICATION
EFFECTIVITY
DELTA DESIGN INC
SCHEMATIC
D
D2633718

DELTA DESIGN, INC.
8000 FLETCHER PKWY.
LA MESA, CALIF. 92041
TEL. (714) 465-4141

Next Ass'y. Parts List

	By	Date
Drafted	MW	3/15/71
Pilot Run App'd.		
Production App'd.		

Parts List: P 2633718 | Rev. | Sheet 1 of 3

Description: MULTI-PACK ENVIRONMENTAL HANDLER

Item	Qty.	Drawing Number	Description	Manufacturer and Part No.	Stock No.	Fab. Code
01	REF	D2633718	LSI CHARGER SCHEMATIC			
02	2	△	BLOWER MOTOR ASSY. BM1, 2		2621001	
03	2	○	CAPACITOR .25/400V C3,5,6,7	CORNELL DUBILIER PM4P25	0702500400	
04	1	X	VOLTAGE SUPPRESSOR S490CR1		1500702	
05	3	○	LAMP 120V DS1, 2, 3	SYLVANIA 120PSB	1400084	
06	3	○	LAMP SOCKET XDS1, 2, 3	SYLVANIA B0099	1400076	
07	1	X	BUZZER DS4	POTTER BRUMFIELD BU40	1500704	
08	1	○	NEON LAMP DS5	380607-2	1400082	
09	1	○	THERMOSWITCH FS1	CAL-STAT IDIC2-4	2300004	
10	2	⬡	HEATER ASSY H1, H2	17.5 OHM	2622512	
11	REF	⬡	HEATER 20W 115V H3,6	HOTWATT SC1235	2200014	
12	4	⬡	LOCK FOR J9 & J10	CINCH-JONES 63A	2000146	
13	1	△	CONNECTOR 4 PIN J1	AMPHENOL 91PC4F	2000044	
14	1	△	PROGRAM SAFETY PLUG P1		2600409	
15	1	○	SOCKET 2 PIN J6	CINCH-JONES S-302-AB	2000023	
16	1	⬡	SOCKET 120V J8	HUBBLE 5256	2000008	
17	1	⬡	SOCKET 4 PIN J9	CINCH-JONES S-304-FP	2000144	
18	1	⬡	SOCKET 33 PIN J10	CINCH-JONES S-333-SB	2000145	
19	1	X	RELAY 3 POLE K1	POTTER BRUM. KRAP14AY	1400212	
20	1	○	RELAY 2 POLE K2	POTTER BRUM. PR7AY	1400218	

Rev.	Date	App'd.	Revision Description
A	3/15/71		DELETED UNUSED ITEMS

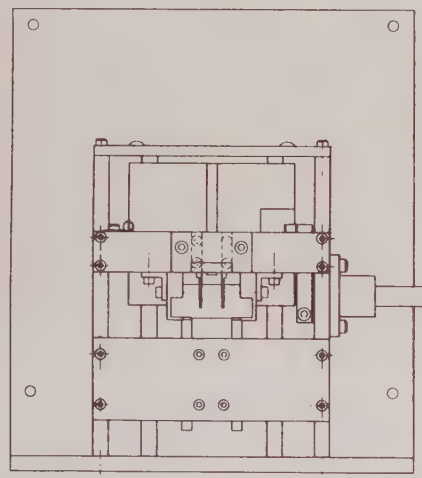
△ = CHAMBER BACK PANEL
○ = CHAMBER PARTITION.
⬡ = CHAMBER
X = DELTAGUARD

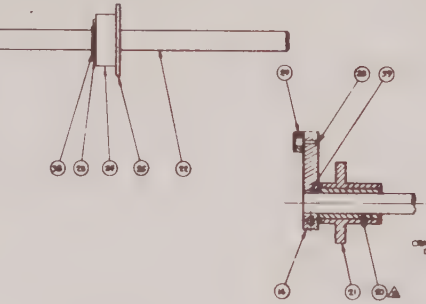
DELTA DESIGN, INC.	Parts List No. P 2633718	Sheet 2 of 3

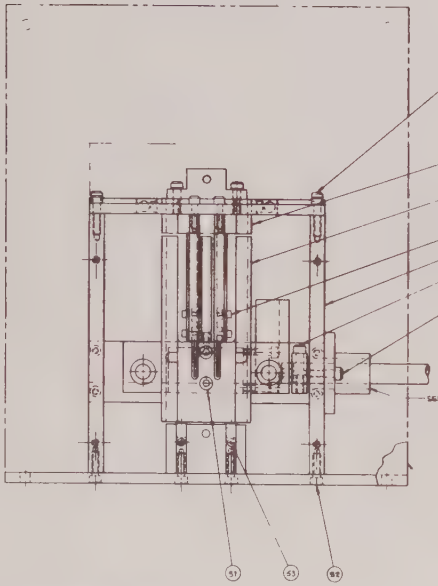
Item	Qty.	Drawing Number	Description	Manufacturer and Part No.	Stock No.	Fab. Code
21	1	X	SOCKET RELAY XK1	AMPHENOL 77M1P11XK1	2500009	
22	1	△	LN_2 CONTROL VALVE L1	ITT	2619034	
23	1	X	DELTA GUARD PC BOARD ASSY	PC1 A1231	1300004	
24	1	○	RESISTOR, PROBE SHUNT 9055 R1		0400008	
25	1	⬡	PROBE, TEMP. R2	LEWIS 56F11A	2300031	
26	4	○	RESISTOR R3,4,5,7,8	100 OHM 1/2W 5%	0310000500	
27	3	○	SWITCH SPST S1,S3, S20	CUTLER-HAMMER 8803K6	1400181	
28	2	○	SWITCH MOMENTARY SPST S2, S19	GRAYHILL 4001	1400161	
29	1	○	SWITCH SPDT S5		1400156	
30	1	○	PLUG 33 PIN P10	CINCH-JONES P333-CCE	2000147	
31	1	○	TRANSFORMER T1	GE 9T51Y136	1400282	
32	1	○	TRANSFORMER (OPTIONAL)	GE	1400287	
33	2	○	TERMINAL BLOCK TB1,2,3,7,9,10	899-8KT	1400521	
34	1	○	TERMINAL BLOCK TB4	3-140	1400510	
35	1	△	TERMINAL BLOCK TB5	2-140Y	1400509	
36	1	○	TERMINAL BLOCK TB6	12-140	1400519	
37	1	⬡	TERMINAL BLOCK TB8	MC-4	1400544	
38	2	⬡	TERMINAL BLOCK TB14 15	8-140	1400531	
39	1	⬡	TERMINAL BLOCK TB12	6-140	1500514	
40	4	○	TERMINAL STRIP TS1,2,3,4	56C	1400505	
41	1	⬡	A1140 CONTROLLER (A1778-240)Z-1	A1140-19		
42	1	KIT	SOCKET, BULB (OPTIONAL)	30152-0	2500022	
43	1	KIT	FILTER, RED (OPTIONAL)		1400115	
44	1	○	LAMP LENS GREEN	SYLVANIA 06-B0132	1400090	
45	1	○	LAMP LENS AMBER	SYLVANIA OY-B0131	1400093	
46	1	○	LAMP LENS RED	SYLVANIA OR-B0130	1400092	
47	11	○	TERMINAL, SPADE 14 AWG	AMP	1500054	
48	28	○	TERMINAL, SPADE 18 AWG	AMP	1500055	
49	8	○	TERMINAL, SLIP-ON 14 AWG	AMP	1500063	
50	60	○	TERMINAL, SLIP-ON 18 AWG	AMP	1500065	
51	10	○	TERMINAL, RING	AMP	1500062	
52	5	⬡	WIRE NUT 14 AWG	IDEAL	1500184	
53	9	⬡	WIRE NUT 18 AWG	IDEAL	1500188	
54	A/R	○	WIRE 20 AWG TEFLON		1500389	
55	A/R	○	WIRE 18 AWG TEFLON		1500388	

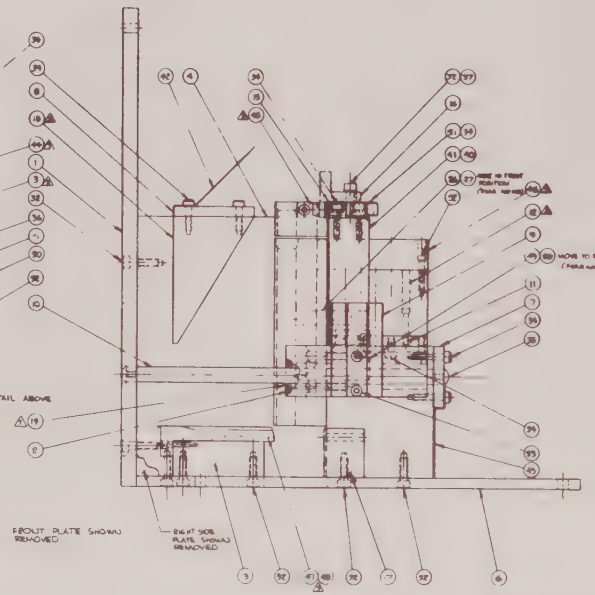
DELTA DESIGN, INC.	Parts List No. P 2633718	Sheet 3 of 3

Item	Qty.	Drawing Number		Description	Manufacturer and Part No.	Stock No.	Fab. Code
56	A/R		O	WIRE 14 AWG TEFLON		1500380	
57	1			FOOT PEDAL (OPTIONAL)		1401187	
58	1	C2634063		DELTALOOP ELECTRONICS			
59	1		KIT	RFI FILTER (OPTIONAL)	GENISCO	1400104	
60	1	A1631002	KIT	COVER, RFI (OPTIONAL)			
61	1		⬡	SOCKET J12	CINCH-JONES S-306-DB	2000172	
62	1		⬡	PLUG P11	MOLEX 1625-12P	2000204	
63	1		⬡	SOCKET J11	MOLEX 1625-12R	2000205	
64	12		⬡	PIN TERMINAL, FEMALE	MOLEX 1561	1400569	
65	12		⬡	PIN TERMINAL, MALE	MOLEX 1560	1400568	
66	1	D2631046		SORT CONTROL PC BOARD ASSY	OPTIONAL		
67	1		X	CAPACITOR		0701200-250	
68	1		X	DIODE	IN4004	1104004	
69	1		X	RELAY		1400207	
70	1		X	RELAY		1400208	
71	1		X	RESISTOR	10 OHM 1/2W 5%	0301000-500	
72	1		X	RESISTOR	4.7K 1W 5%	0304720-500	
73	2		X	SOCKET		2500002	
74	4		X	STANDOFF		4100097	
75	1		O	TRANSFORMER T3	TRIAD F45X	1400264	
76	1		O	TERMINAL BLOCK TB16	C.J. 2-140	1400503	
77	1	A2634785		PHOTODETECTOR BUFFER P.C. Bd. ASSY			
78	REF	A1634783		SCHEMATIC, PHOTODETECTOR BUFFER Bd			
79	1			EDGE CONNECTOR, " "	" 2VH6/1JN5 VIKING	2000180	
80	1			COUNTER	E.N.M. E2B7 115V	1400330	
81	REF	C2634215		PHOTOSENSOR PLUG & JACK ASSY			









CARRIER	TRANS. CHUTE	ADAPTER CHUTE	CHUTE BRACKET	DROP CAM	DROP CAM SUPPORT	TRANS. SUPPORT	RAMP	INPUT CHUTE	OUTPUT CHUTE	MAGAZINE
.029 .71 x .10	C1634571	B1634534	B1634519	B1634587	B1634586	B1634588 (2)	B1634592 LH B1634593 RH	C1634994	D1634998	B1630860
.059 .15 x .35	C1634578	B1634478	B1634580	B1634585	—	B1634602E (2)	B1634720 LH B1634721 RH	D1633982	D1634004	C1633977
.125 x .7	C1634572	B1634536	B1634580	B1633586	—	B1634602L (2)	B1634578 LH B1634591 RH	D1634642	D1634849	C1633977
.125 x .85	C1634967	B1634578	B1634580	B1633602	—	B1634608	•	D1634642	D1634849	C1633977
* 2.0 x 2.0	C1635786	B1684677	B1634581	B1633806	—	B1634604	•	D1633980	D1633986	C1633913

* 2.0 x 2.0 MECHANISM SHOWN BELOW.

2	#8-40 x 1/4 SOC. HD. SCR.				43
6	#8-40 x 3/8 SOC. HD. SCR.				42
1	CLAMP				41
1	STOP FINGER, L.H. .029				40
1	STOP FINGER, R.H. .029				39
1	RAMP, L.H. .029				38
1	RAMP, R.H. .029				37
1	TRANSFER SUPPORT				36
2	CHUTE BRACKET				35
1	ADAPTER CHUTE				34
1	BAFFLE, BACK PLATE				33
1	BAFFLE, TOP				32
1	SUPPORT, STOP FINGER, L.H.				31
1	SUPPORT, STOP FINGER, R.H.				30
1	KEY 1/8" SQ. x 7/8 LG.			1/8 SQ. KEYSTK	29
1	SHAFT, CRANK		1900891	STUD MTD	TRUARC 28
2	#10 LOCKWASHER				27
4	#8-40 x 1/4 SOC. HD. SCR.				26
4	#8 32 x 1/4 TRUSS HD. SCR.				25
10	#8 32 x 1/4 SOC. HD. SCR.				24
2	#8 32 x 3/8 SOC. HD. SCR.				23
17	#10 32 x 1/4 SOC. HD. SCR.				22
2	#10 32 x 3/8 SOC. HD. SCR.				21
4	#10 32 x 1 SOC. HD. SCR.				20
1	BLOCK, GUIDE		A1631031		19
1	PIN, CRANK ARM		A1630891		18
1	STOP FINGER, R.H.		A1630889		17
1	STOP FINGER, L.H.		A1630888		16
1	WASHER, TEFLON		D1631868		15
1	INSULATOR		B1633867		14
1	WASHER, BRASS		D1633840		13
1	CRANK SHAFT		B1633850		12
1	BEARING, BLOCK		B1633809		11
1	BEARING, CRANK SHAFT		B1633808		10
4	BEARING, TRANS. BLK.		B1633851		9
2	DROP CAM		B1633805		8
1	BRACKET, OUTPUT CHUTE		B1633589		7
1	BRACKET, INPUT CHUTE		B1633588		6
1	PLATE, INPUT CHUTE		B1633868		5
1	CRANK ARM		B1633866		4
2	RAMP SUPPORT		B1634609		3
1	TRANS. SUPPORT, OFF BASE		B1634605		2
1	TRANS. SUPPORT, BASE		B1634588		1
2	TRANSFER BLOCK SHAFT		B1633892		14
1	TRANSFER TRACK		B1633577		13
1	DROP CAM BRIDGE		C1633976		12
1	BACK PLATE		C1633872		11
1	BASE PLATE		C1633799		10
1	SIDE PLATE, RIGHT		C1633798		9
1	SIDE PLATE, LEFT		C1633797		8
1	TRANSFER CHUTE		C1633796		7
1	TRANSFER BLOCK		C1633795		6
1	F.ROUT PLATE		D1633786		5
REF	ASSEMBLY		E2633793		4

SEE DETAIL ABOVE

F.ROUT PLATE SHOWN REMOVED

RIGHT SIDE PLATE SHOWN REMOVED

MOVE TO REAR POSITION (PERFORMED FOR OTP)

MOVE TO FRONT POSITION (PERFORMED FOR OTP)

CRANK ARM - BEARING BLOCK DETAIL SCALE 1/1

4. FOR MECHANISM CHANGES PER CARRIER SIZE SEE CHART ABOVE.

3. PASS .508 DIA. REAMER THRU BEARING AFTER IT IS PRESSED INTO BEARING BLOCK.

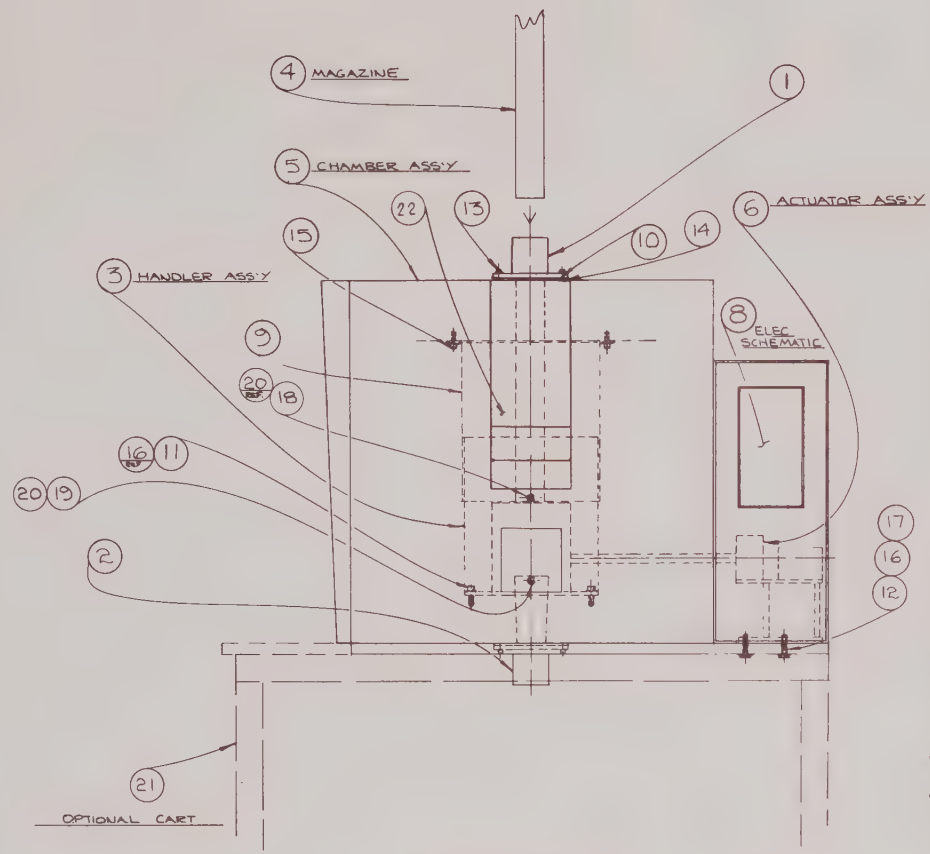
2. PASS .381 DIA. REAMER THRU BEARINGS AFTER THEY ARE PRESSED INTO TRANSFER BLOCK.

NOTES

HANDLER, MECHANISM ASSY

E2633793

ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	DELETED ITEM 7 — REVISED ITEM 1, 2, 3 & 4	7-30-71	[illegible]
	B	ADDED ITEM 22	8-17-71	[illegible]



1	FAU SHROUD ASS'Y		P2634239			22
1	OPTIONAL CART		D2633973			21
2	#10 SPLIT LOCK WASHER		6601010			20
1	SOC H'D CAP SCR (ST STL)		6810323208	#10-32 × 1½		19
1	SOC H'D CAP SCR (ST STL)		6810325808	#10-32 × ⅝		18
4	¼ FLATWASHER		6601400			17
8	¼ SPLITLOCK WASHER		6601410			16
3	SOC H'D CAP SCR (ST STL)		6806321208	#6-32 × ½		15
2	#6 SHT METAL SCR.		6906120	#6 × ½		14
8	KNURLED SCREW		1700171	#6-32 × ½		13
4	HEX H'D BOLT (ST STL)		6814207407	¼-20 × 1¾		12
4	SOC H'D CAP SCR (ST STL)		6814203408	¼-20 × ¾		11
2	INPUT/OUTPUT CHUTE GASKET		C1633972			10
1	MECH BAFFLE		C1633971			9
	ELEC ACCESSORIES		D1633719			
	ELEC SCHEMATIC		D2633718			8
						7
1	ACTUATOR ASS'Y		E2633762			6
1	CHAMBER ASS'Y		E2633854			5
"			B2630660	FOR 029 CARRIERS		4
OR			C2633977	FOR 039	1.25 x 1.75, 1.7, 2.5	4
OR						
AS REQ'D	MAGAZINE		C2633913	FOR 039	2.0 x 2.0	4
1	HANDLER ASS'Y		E2633793			3
			D2634598	FOR 029	.75 x 1.0	2
OR			D2634849	FOR 039	1.25 x 1.7 & 2.5	2
OR			D2633926	FOR 039	2.0 x 2.0	2
OR			D2634004	FOR 039	1.25 x 1.25	2
1	OUTPUT CHUTE ASS'Y		C2634594	FOR 029	.75 x 1.0	1
OR			D2634642	FOR 039	1.25 x 1.7 & 2.5	1
OR			D2633982	FOR 039	1.25 x 1.25	1
OR			D2633920	FOR 039	2.0 x 2.0	1
1	INPUT CHUTE ASS'Y		D2633920	FOR 039	2.0 x 2.0	1

QTY. REQ'D	NOMENCLATURE OR DESCRIPTION	CODE IDENT.	IDENTIFYING NUMBER	SPECIFICATION	MATERIAL OR NOTE	ITEM NO.

NOTES:

APPLICATION		EFFECTIVITY		
NEXT ASSY	USED ON	SERIAL NOS.	DATE EFF.	ENG. REV. LTR.
TOP				

	BY	DATE
DESIGN		
DRAFTED	[illegible]	11/17/71
CHECKED		
APPROV		

MATERIAL

FINISH

DO NOT SCALE DRAWING

PART NO.

DELTA DESIGN INC.
8000 FLETCHER PKWY.
LA MESA, CALIF. 92041
TEL. A/C (714) 465-4141

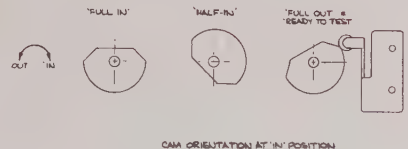
TITLE: TOP ASS'Y
MODEL 8195

SIZE	CODE IDENT. NO.	DRAWING NO.	REV. LTR.
D		2633912	8

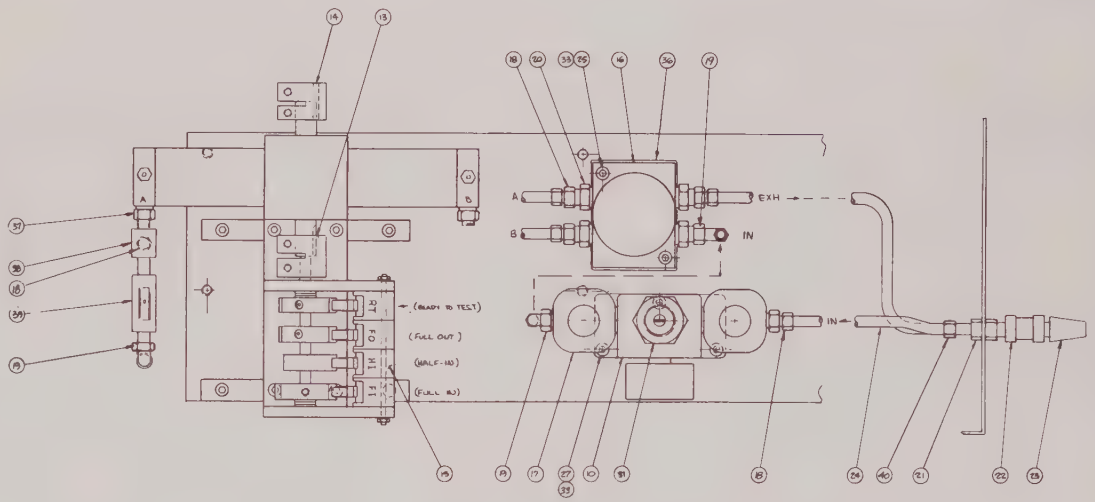
SCALE

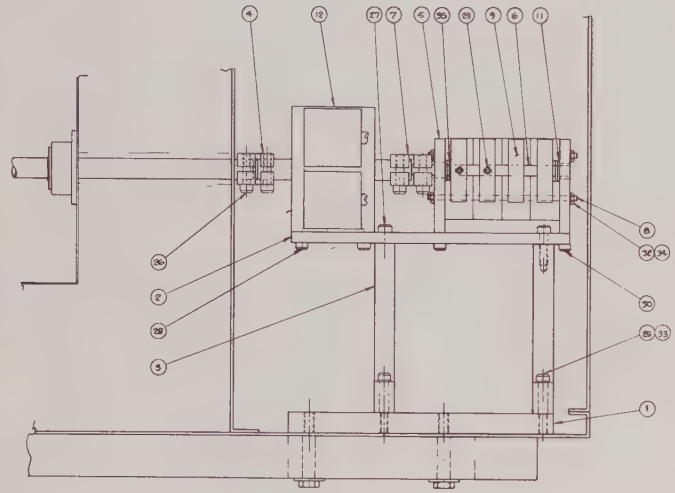
SHEET 1 OF 1

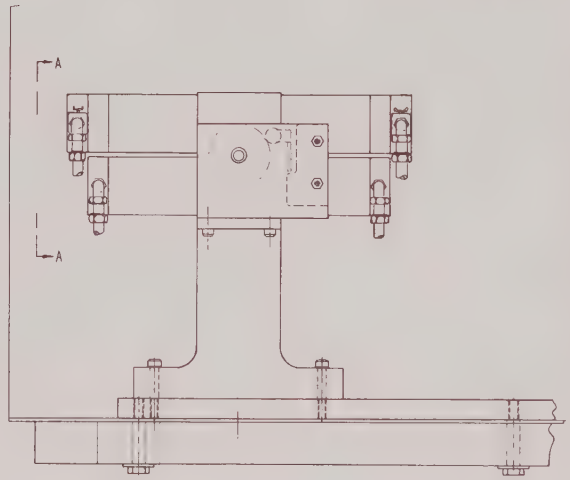
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	REVISED AIR HOSE FITTINGS	7-8-74	[illegible]

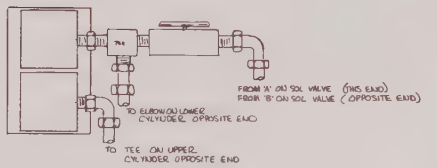


CAM ORIENTATION AT 'IN' POSITION








FROM 'A' ON SOL VALVE (THIS END)
FROM 'B' ON SOL VALVE (OPPOSITE END)
TO ELBOW ON LOWER CYLINDER OPPOSITE END
TO TEE ON UPPER CYLINDER OPPOSITE END

VIEW A-A

QTY	DESCRIPTION		IDENTIFYING NUMBER	SPECIFICATION		ITEM NO.
2	RIVET OUT		3601062			40
2	CONTROL VALVE		1800126			39
2	STREET TEE		3600115			38
2	FITTING		3600162			37
1	INSULATOR		B1634042			36
4	BRASS WASHER		6608030			35
4	#4 LOCKWASHER		6606010			34
9	#10 WASHER		6610000			33
4	#4-40 HEX NUT		6704400			32
REF	1/4-6 HEX NUT		673416			31
4	#8-32 x 1/2 SOC HD SCR		6808321208			30
4	#10-32 x 1/4 SET SCR		1700202	CUP POINT		29
4	#10-24 x 1/2 SOC HD SCR		6810241208			28
7	#10-32 x 1/2 SOC HD SCR		6810321208			27
4	#10-32 x 1 SOC HD SCR		6810321008			26
6	#10-32 x 1 1/4 SOC HD SCR		6810325408			25
AR	HOSE		02001131			24
1	MUFFLER		3600167			23
1	COUPLING		3600077			22
2	BULK HEAD FITTING		3601011			21
4	REDUCER		3601012			20
6	ELBOW		3601070			19
6	HOSE FITTING		3601024			18
1	AIR REGULATOR ASSY		1800038			17
1	AIR SOLENOID VALVE		1800122			16
4	SWITCH (ROLLER)		1400166	BZ 2RW822	MICRO	15
1	1/8" SQ x 1.0 LG KEY		B1633892	KEY STOCK		14
1	1/4 SQ x 4.0 LG KEY		B1633941	KEY STOCK		13
1	ROTARY CYLINDER		3601082	TEA 2080 P.D	P.H.D	12
2	BEARING BRONZE		4100066	FB-46-2	BOSTON	11
1	BRACKET, REGULATOR		C1630900			10
4	CAM		A1633472			9
2	#4-40 x 3.50 LG THRD SOC		B1632167			8
1	COUPLING, CAM SHAFT		B 633691			7
1	CAM SHAFT		B1633990			6
2	SUPPORT CAM SHAFT		B1633989			5
1	COUPLING CRANK SHAFT		B1633813			4
2	SUPPORT LEG		B1633812			3
1	BASE CAM SUPPORT		B1633811			2
1	MOUNT PLATE		C1633800			1
REF	ASS'Y		E2633762			

NOTES:

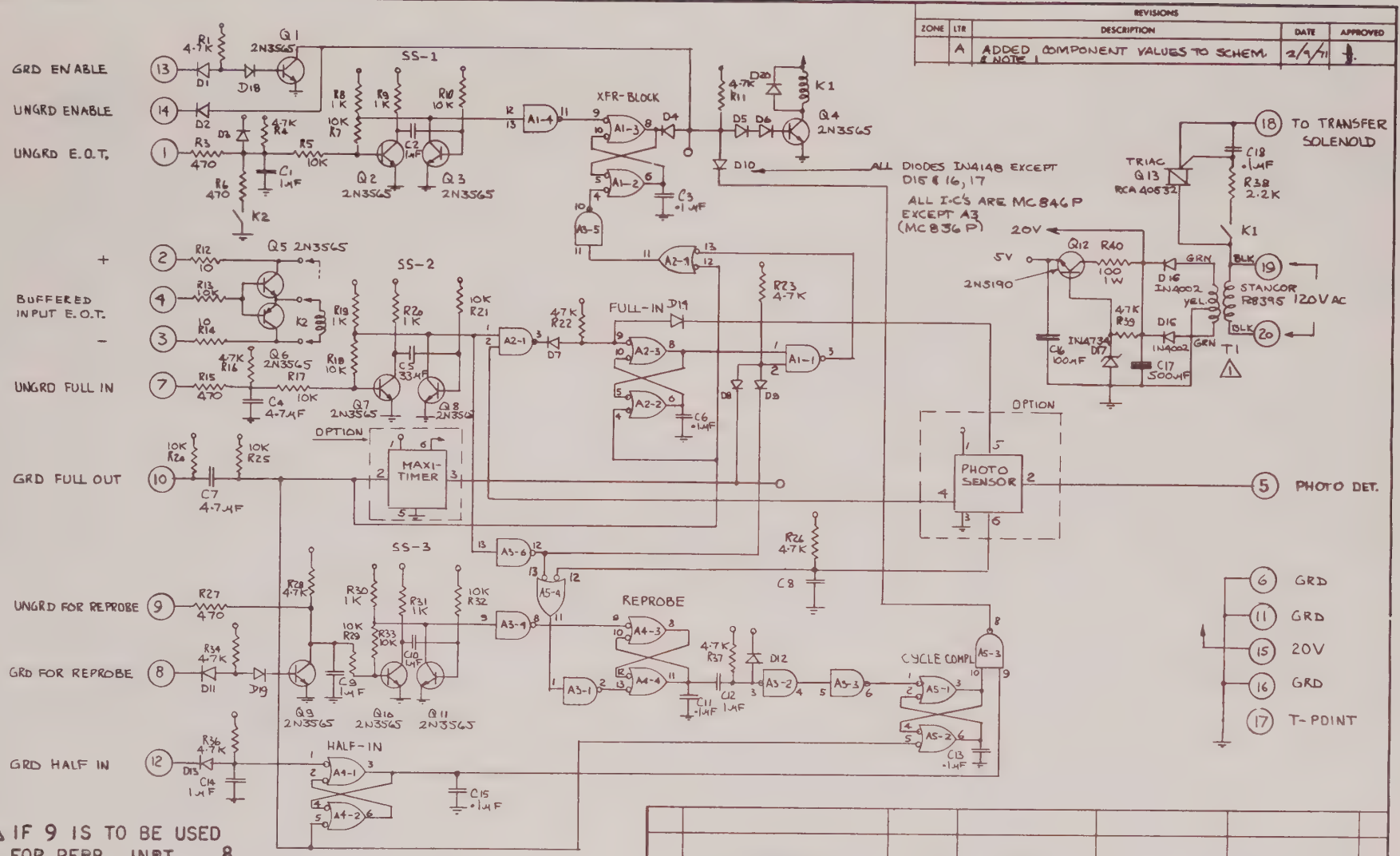
D2633761E			
NEXT ASSY	USED ON	SERIAL NOS.	DATE EFF.
APPLICATION			EFFECTIVITY

DELTA RESEARCH INC.
PITTSBURGH, PENNSYLVANIA 15238
PH. A/C (412) 963-9141

TITLE: ROTARY ACTUATOR ASS'Y

SIZE	CODE IDENT. NO.	DRAWING NO.	REV. LTR.
E		E2633762	A

MODEL NO.
PART NO. 2633762
SCALE 1:1 SHEET 1 OF 1



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	ADDED COMPONENT VALUES TO SCHEM. & NOTE 1	2/9/71	

⚠ IF 9 IS TO BE USED FOR REPB. INPT., 8 MUST BE TIED TO GND.

⚠ FOR 50 HZ OPERATION REFER TO PARTS LIST FOR T1 TRANSFORMER CALL OUT.

NOTES:

QTY. REQ'D	NOMENCLATURE OR DESCRIPTION	CODE IDENT	IDENTIFYING NUMBER	SPECIFICATION	MATERIAL OR NOTE	ITEM NO

NEXT ASSY.	USED ON	SERIAL NOS.	DATE EFF.	DWG. REV. LTR.
APPLICATION		EFFECTIVITY		

UNLESS OTHERWISE SPECIFIED DIMENSION ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS .XX ±.010 .XXX ±.005 ANGLES ± ½°

MATERIAL:

FINISH

PART NO.

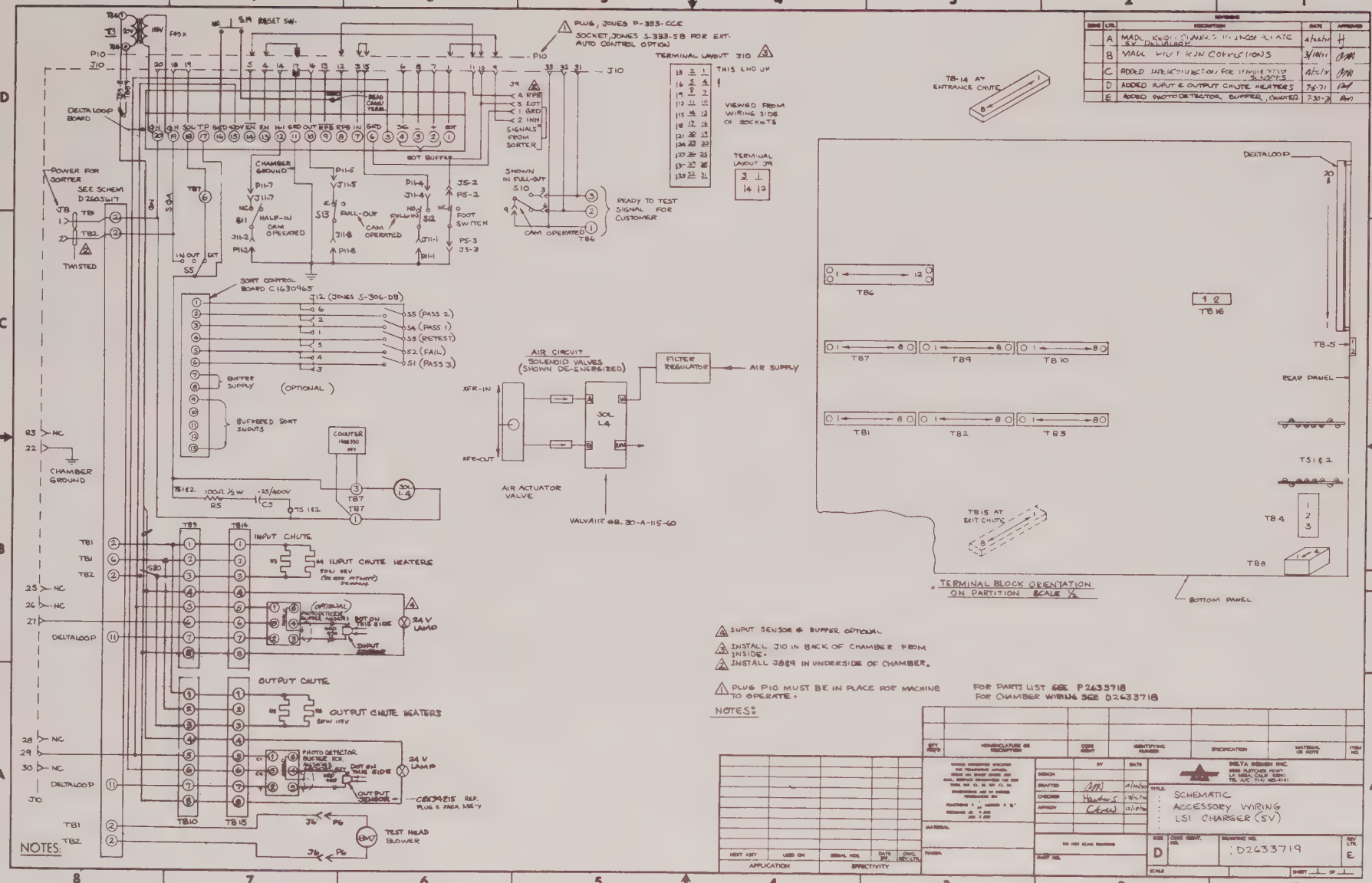
	BY	DATE
DESIGN	H Jarlow	
DRAFTED		
CHECKED		
APPROV.		

DELTA DESIGN INC.
8000 FLETCHER PKWY.
LA MESA, CALIF. 92041
TEL: A/C (714) 465-4141

TITLE: DELTA-LOOP ELECTRONICS

SIZE	CODE IDENT. NO.	DRAWING NO.	REV LTR
C		C1634063	A

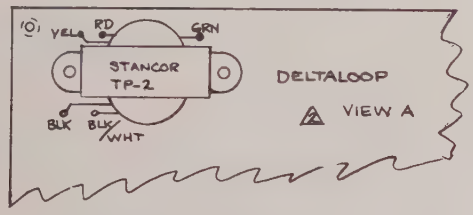
SCALE | SHEET 1 OF 1

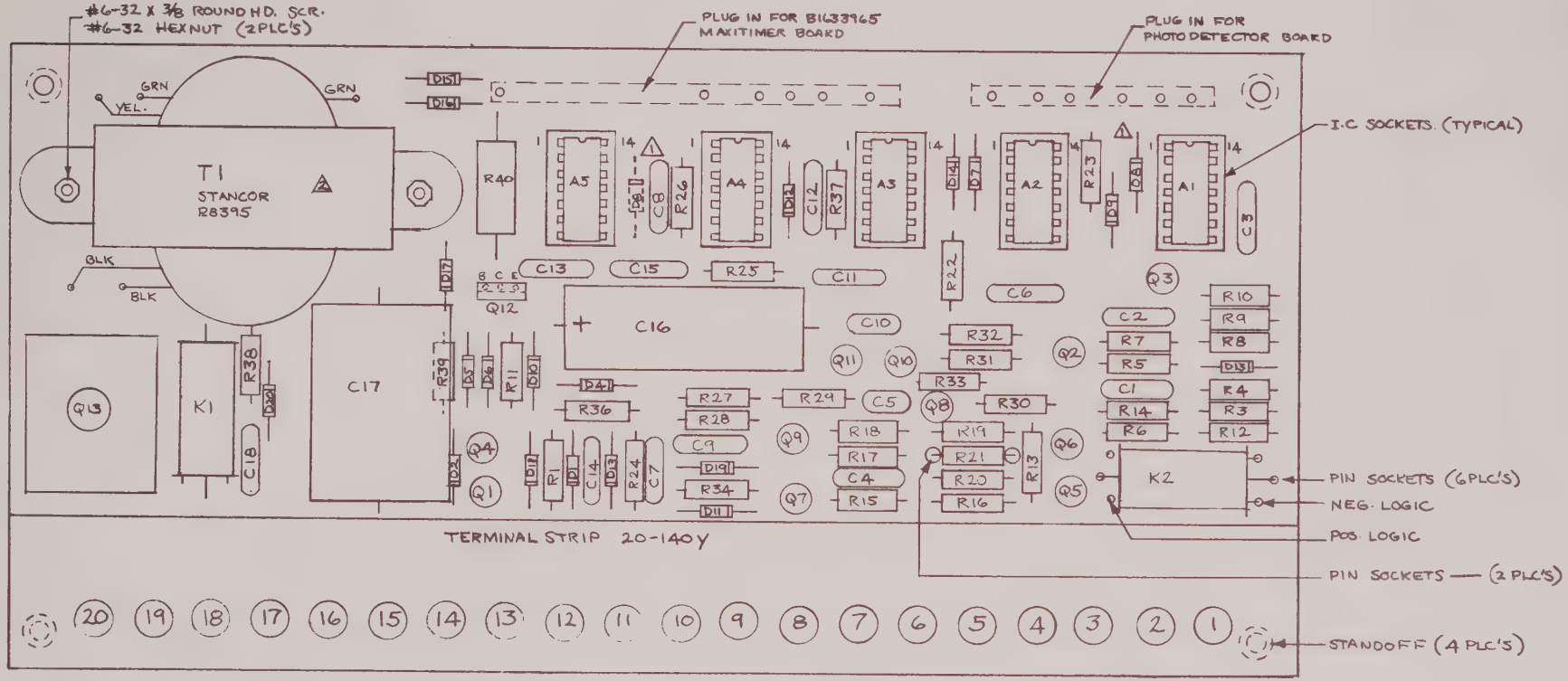


ZONE	LTR.	DESCRIPTION	DATE	APPROVED
	A	MADE REQD. CHANGES TO JUNCTION PLATE 5V DELIDESK	2/26/71	
	B	MADE MISC. J&J CONNECTIONS	3/10/71	
	C	ADDED INTERCONNECTION FOR INPUT/OUTPUT SENSORS	4/6/71	
	D	ADDED INPUT & OUTPUT CHUTE HEATERS	7-6-71	
	E	ADDED PHOTO DETECTOR, BUFFER, COUNTER	7-30-71	

DESIGN				
DRAFTED	MR	12/14/70	DELTA RESEARCH INC. 8500 BALBOA BLVD. LA MESA, CALIF. 92041 TEL A/C 714 465-4141	
CHECKED	Hawkins	12/14/70	TITLE: SCHEMATIC ACCESSORY WIRING LSI CHARGER (5V)	
APPROV	Crew	12/17/70	SIZE D	DRAWING NO. D2633719
			SCALE	SHEET 1 OF 1

REVISIONS				
ZONE	LTR.	DESCRIPTION	DATE	APPROVED
	A	ADDED NOTE ⚠2 & ILLUS. A	2/9/71	H.





QTY REQ'D	NOMENCLATURE OR DESCRIPTION	CODE IDENT.	IDENTIFYING NUMBER	SPECIFICATION	MATERIAL OR NOTE	ITEM NO

⚠2 FOR 50 HZ REQUIREMENT USE STANCOR TP-2 DR#1400296. CONNECT AS ILLUSTRATED BY VIEW A.

⚠1 IF SOAKTIME FROM MAXITIMER IS DESIRED TO TAKE PLACE IN "FULLOUT" POSITION INSTEAD OF FULL-IN, REMOVE DR. FROM STANDARD POSITION & INSTALL WHERE SHOWN BY DOTTED LINES.

NOTES:

NEXT ASSY	USED ON	SERIAL NOS	DATE EFF	DWG REV. LTR
APPLICATION		EFFECTIVITY		

UNLESS OTHERWISE SPECIFIED DIMENSION ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS .XX ± .010 .XXX ± .005 ANGLES ± ½

MATERIAL

FINISH

PART NO

	BY	DATE
DESIGN		
DRAFTED		1/25/71
CHECKED		
APPROV.		

DELTA DESIGN INC.
8000 FLETCHER PKWY.
LA MESA, CALIF. 92041
TEL. A/C (714) 465-4141

TITLE
: DELTALOOP
: STUFFING SHEET

SIZE	CODE IDENT NO	DRAWING NO	REV LTR
C		C1634032	A

SCALE 2:1 SHEET 1 OF 1

DELTA DESIGN, INC.
8000 FLETCHER PKWY.
LA MESA, CALIF. 92041
TEL. (714) 465-4141

	By	Date
Drafted	VM	2/9/71
Pilot Run App'd.		
Production App'd.		

Next Ass'y. Parts List

Parts List P 2634032 | Rev. C | Sheet 1 of 2

Description: P. C. BOARD ASSY., DELTA LOOP

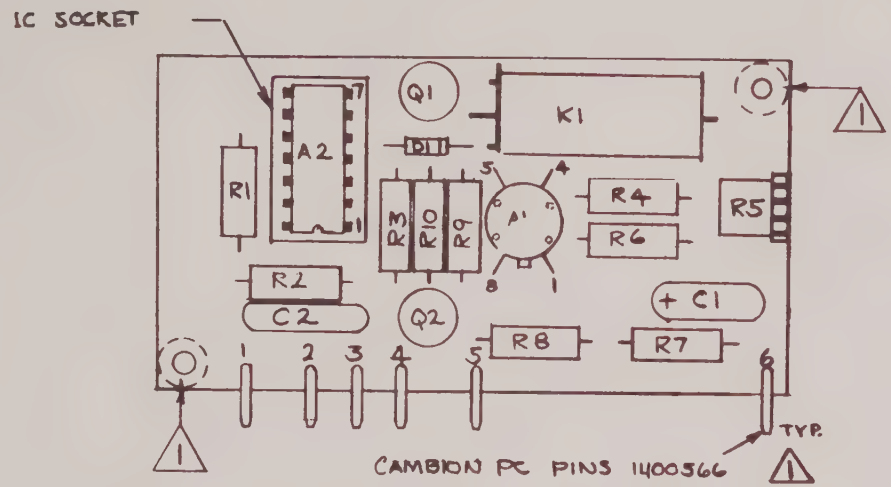
Item	Qty.	Drawing Number	Description	Manufacturer and Part No.	Stock No.	Fab. Code
00	1		P.C. BOARD, DELTA LOOP C1634027C	DELTA DESIGN	1634063	
01	4		INTGR. CIRCUIT MC846P, A1, A2, A4, A5	MOTOROLA	1000010	
02	1		INTGR. CIRCUIT MC836P, A3	MOTOROLA	1000011	
03	11		TRANSISTOR, Q1 - Q11	FAIRCHILD 2N3565	1203565	
04	1		TRANSISTOR Q12	MOTOROLA 2N5190	1205190	
05	1		TRIAC #40532, Q13	RCA	1201541	
06	22		DIODE, D1 - D14, D18, D19, D20-D22, D24-D26	FAIRCHILD 1N4148	1104148	
07	2		DIODE, D15, D16	MOTOROLA 1N4001	1104001	
08	1		ZENER DIODE, D17	DICKSON 1N4734A	1104734	
09	6		1 uF/34VDC 196D-105X0035HA1, C1,	SPRAGUE	0700100035	
			C2, C9, C10, C12, C14			
10	7		0.1 F/100 225P10491, C3, C6,	SPRAGUE	0800008	
			C11, C13, C15, C18			
11	1		33 uF/10V 196D-336X0010KA1, C5	SPRAGUE	0703300010	
12	3		4.7 uF/10 VDC 196D-475x0010HA1, C7,	C4, C8 SPRAGUE	0704710010	
13	1		100 uF/50 VDC, C16	SPRAGUE	0710000050	
14	1		500 uF/25 VDC 39D-507C025HE4, C17	SPRAGUE	0750000025	
15	12		RESISTOR 4.7K OHM 1/2W 5%, R1, R4,		0304720500	
			R11, R16, R22, R23, R39, R26, R28,			
			R36, R37, R34			

Rev.	Date	App'd.	Revision Description
A	2/9/71		ADDED STANCOR 1400 GE AS STANDARD UNIT
B	6/2/71		ADDED D21 - D26, CHANGED C8 TO A 4.7uF, CHANGED PC# FROM 2634027 TO 4032
C	9-9-71		DELETED D23 DIODE

DELTA DESIGN, INC.	Parts List No. P 2634032 REV. B	Sheet 2 of 2

Item	Qty.	Drawing Number	Description	Manufacturer and Part No.	Stock No.	Fab. Code
16	12		RESISTOR 10K OHM 1/2W 5%, R7 R10		0301030500	
			R18, R5, R17, R24, R25, R29, R33			
			R21, R32, R13			
17	4		RESISTOR 470 OHM 1/2W 5%, R3, R15		0347000500	
			R27, R6			
18	6		RESISTOR 1K OHM 1/2W 5%, R8, R9		0300130500	
			R19, R20, R30, R31			
19	2		RESISTOR 10 OHM 1/2W 5%, R12, R14		0301000500	
20	1		RESISTOR 2.2K OHM 1/2W 5%, R38		0302220500	
21	1		RESISTOR 100 OHM 1W 5%, R40		0310001500	
22	1		RELAY 12V TO 24V, K1	PHIPPS OF-1A-12	1400236	
23	1		RELAY 5V TO 12V, K2, CUST. ORDER	PHIPPS OF-1A-6	1400237	
			RELAY 12V TO 24V, CUST. ORDER	PHIPPS OF-1A-12	1400236	
			RELAY 24V TO 48V, CUST. ORDER	PHIPPS OF-1A-24	1400234	
24	8		PIN SOCKET FOR K2 & R21	ROBINSON NUGENT PS-301-14	2500023	
25	1		TRANSFORMER, T1	STANCOR P-8395	1400268	
26	1		TERMINAL STRIP 20-164Y/600Y-20	CINCH JONES	1400417	
27	5		I.C. SOCKET 14-DIP	CINCH JONES	2500051	
28	4		3/8" STANDOFF	CAMBION	4100097	
29	2		#6-32 x 3/8 RD HD SCR SST.		6806323800	
30	2		#6-32 HEX NUT		6706320	
31	1	*	TRANSFORMER, T1	TRIAD F90X OR STANCOR	1400296	
32	2		PC PINS	BEEDE CHAIN	2000184	
		C2634032C	ASSEMBLY SHEET, DELTALOOP			
	REF	C1634027C	P.C. BOARD ART WORK	DELTA DESIGN	130084	
	REF	C1634028	DRILLING INSTRUCTION	DELTA DESIGN		
	REF	C1634128	BLOCK DIAGRAM			
		*	USE FOR 50 HZ REQUIREMENT, OR			
			ALTERNATE FOR STANCOR DP#1400268			
			(STANDARD UNIT). REFER TO C1634032			
			FOR INSTALLATION INSTRUCTIONS.			
	REF	C1634032C	SCHEMATIC, DELTALOOP			

REVISIONS				
ZONE	LTR.	DESCRIPTION	DATE	APPROVED



QTY REQ'D	NOMENCLATURE OR DESCRIPTION	CODE IDENT.	IDENTIFYING NUMBER	SPECIFICATION	MATERIAL OR NOTE	ITEM NO

⚠ FOR PLATE MOUNTING OF PC BOARD INSTALL 3/8"x6-32 STANDOFFS 4100406. DELETE PC PINS 1400556. REDRILL HOLES 1 THRU 6 WITH #51

NOTES: DRILL & INSTALL BEEDE-CHAIN PINS 2000189

NEXT ASSY.	USED ON	SERIAL NOS	DATE EFF.	DWG REV LTR
APPLICATION		EFFECTIVITY		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS DECIMALS ANGLES
± 1/64 .XX ± .010 ± ½°
.XXX ± .005

MATERIAL:

FINISH

	BY	DATE
DESIGN		
DRAFTED	BJN	1/21/71
CHECKED		
APPROV.		

PART NO.

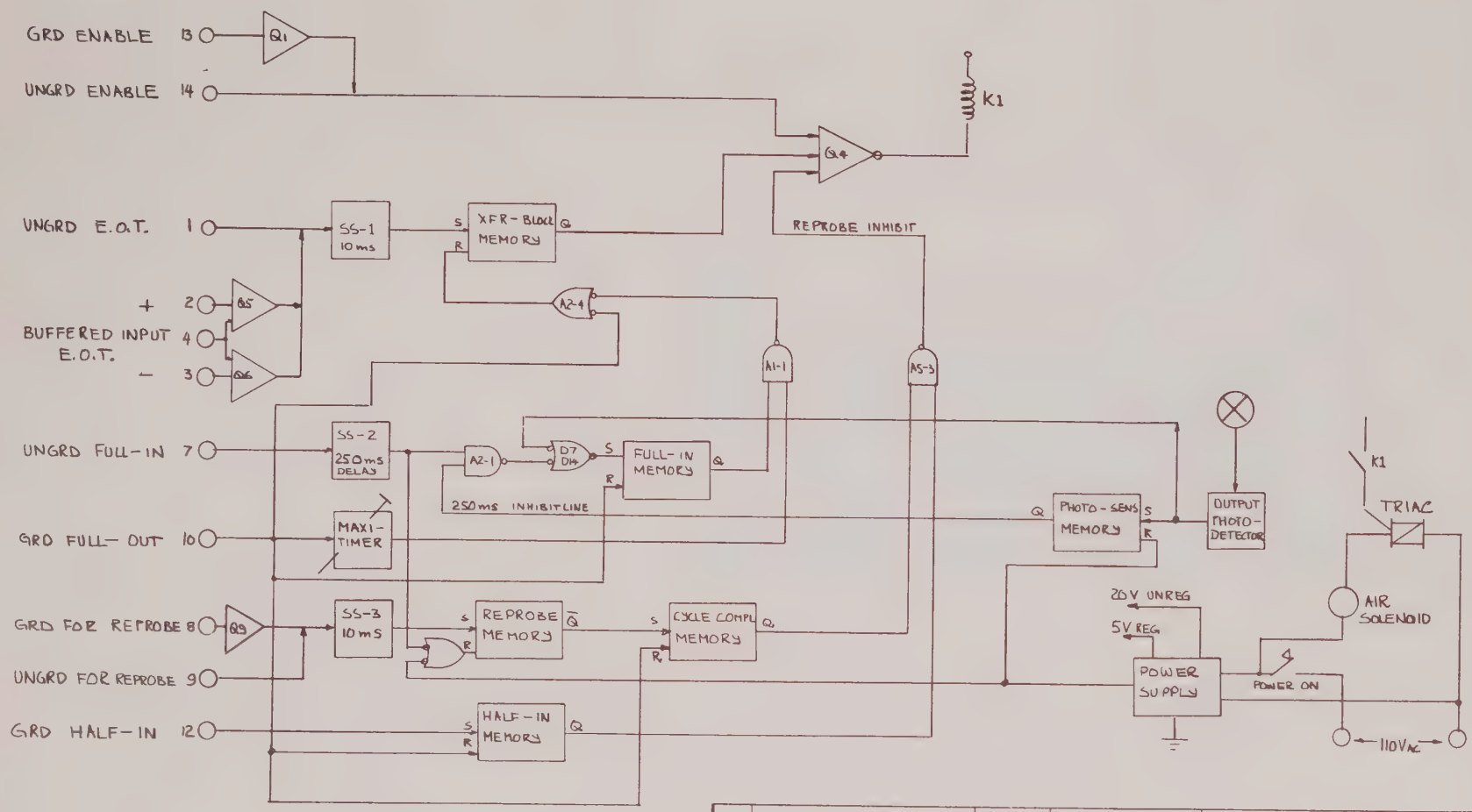
DELTA DESIGN INC.
8000 FLETCHER PKWY.
LA MESA, CALIF. 92041
TEL: A/C (714) 465-4141

TITLE: STUFFING SHEET MAXITIMER

SIZE	CODE IDENT. NO.	DRAWING NO.	REV LTR
B		B1634031	

SCALE 2:1 SHEET 1 OF 1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



QTY REQ'D	NOMENCLATURE OR DESCRIPTION	CODE IDENT	IDENTIFYING NUMBER	SPECIFICATION	MATERIAL OR NOTE	ITEM NO

NEXT ASSY	USED ON	SERIAL NOS	DATE EFF	DWG. REV LTR.
APPLICATION		EFFECTIVITY		

UNLESS OTHERWISE SPECIFIED THE FOLLOWING APPLIES
BREAK ALL SHARP EDGES .005
MAX. SURFACE ROUGHNESS 125 RMS
THDS. INT CL 2B, EXT CL 2A
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 ANGLES ± ½°
DECIMALS .XX ± .010
.XXX ± .005

MATERIAL

FINISH

	BY	DATE
DESIGN	Hardware	3/3/71
DRAFTED	"	3/3/71
CHECKED	Hardware	3/3/71
APPROV		

DO NOT SCALE DRAWING

PART NO

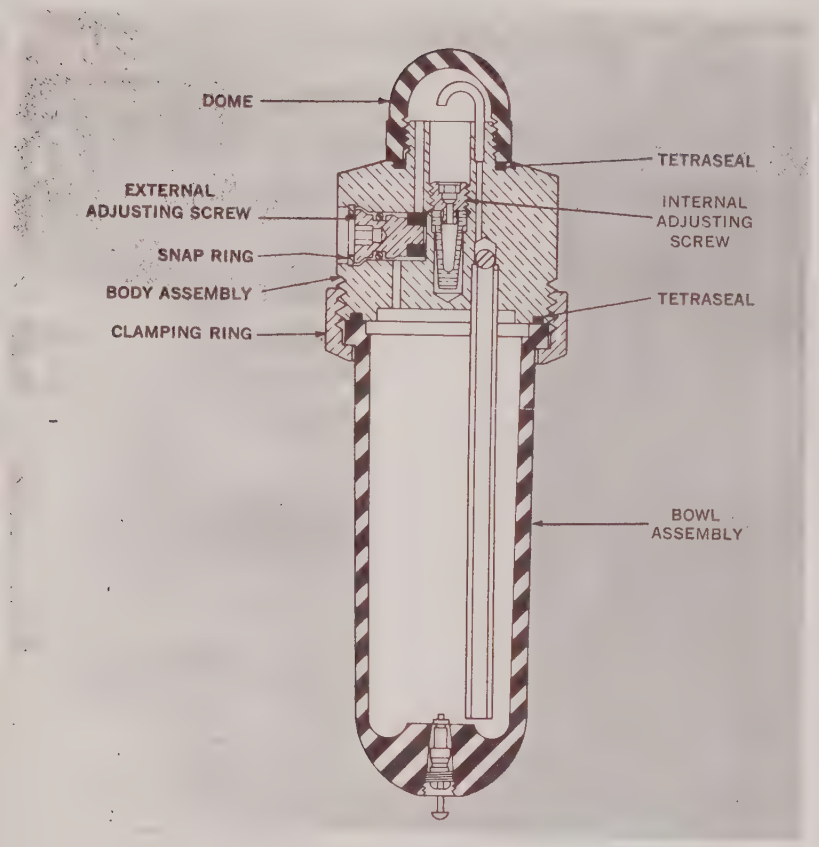
DELTA DESIGN INC.
8000 FLETCHER PKWY
LA MESA, CALIF 92041
TEL. A/C (714) 465-4141

TITLE: BLOCK-DIAGRAM DELTA-LOOP

SIZE	CODE IDENT NO	DRAWING NO	REV LTR
C		C1634128	

SCALE | SHEET 1 OF 1

NOTES:



OPERATING RANGES

WORKING PRESSURE.....150 psi maximum
TEMPERATURE RANGE.....+10°F. to +125°F.

INSTALLATION

1. To assure dependable lubrication, a Mini-Filter should be installed upstream from the lubricator.
2. Lubricators must be installed with air flow in the direction indicated on the body. When used with a filter and/or regulator, the lubricator should be installed downstream from these units. Lubricators should be installed as close as possible to the device to be lubricated. Avoid installations that require the air-oil mixture to move upward from the lubricator to the device to be lubricated.
3. To assure proper lubrication, install a separate lubricator for each air operated device.
4. Mini-Lubricators are designed for operation under the air flow rate normal for the port size of each unit. Subnormal air flows may result from use of speed control valves, in which case the lubricator size should be selected according to **anticipated air flow rates** rather than the port size of the devices to be served.

OPERATION

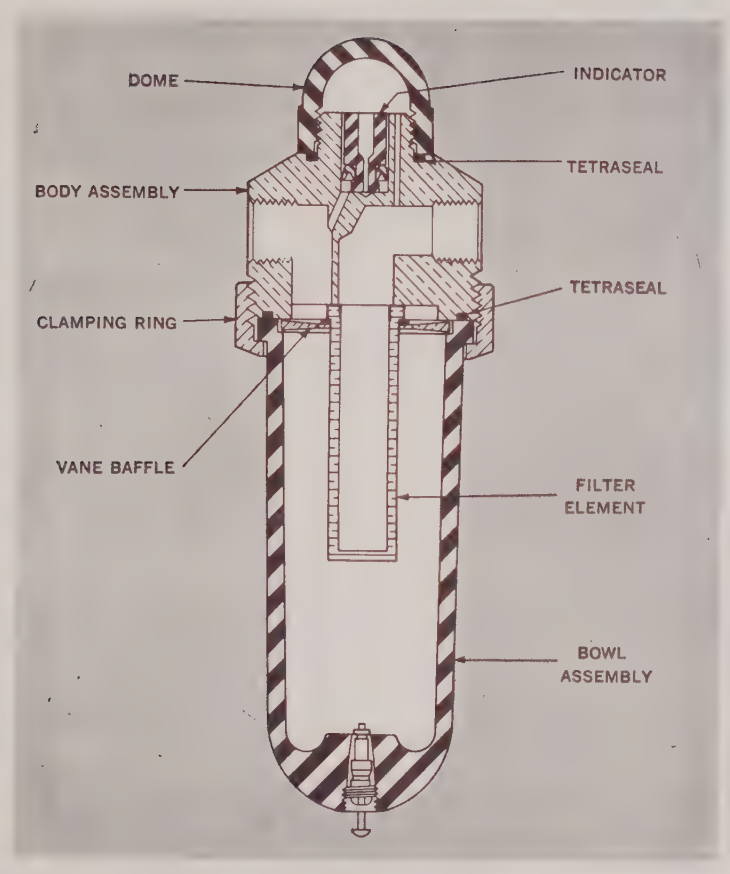
1. **IMPORTANT: Use only those oils recommended by the supplier as suitable for pneumatic-hydraulic service. Oils with adhesive-type additives should not be used.** Use oil with a viscosity of 80 to 150 SSU at 100°F. Compounded oils, including automotive oils, containing detergents or other additives such as solvents, soaps or graphite are not recommended.
2. To fill the oil reservoir bowl:
   a) Shut off the air supply and bleed down line pressure.
   b) Unscrew and remove the clamping ring.
   c) Remove the bowl and fill with oil (See #1, above).
   d) Replace the bowl and clamping ring and turn on air supply.
3. Operate the air equipment to be lubricated and observe the oil delivery rate in the oil feed indicator dome. The rate of oil feed shown in the dome is 100% of the oil that is being injected into the air stream in mist form.
4. The oil delivery rate has been factory pre-set to provide proper lubrication for most operating conditions. It may be adjusted within normal operating ranges by turning the external adjustment. For extreme air flow rates (less than .5 CFM or extremely high flow) it is necessary to adjust the oil delivery rate internally. To do this:
   a) Shut off the air supply and bleed down line pressure.
   b) Unscrew and remove the dome.
   c) Using a 3/32" allen wrench, turn the internal adjusting screw clockwise to increase the delivery rate or counter clockwise to decrease the rate.
   d) Replace the dome and turn on line pressure.

CLEANING

CAUTION: Do not attempt to disassemble unit while line is under pressure.

1. Shut off the air supply and bleed down line pressure.
2. Unscrew and remove the clamping ring.
3. Remove and wash the bowl in kerosene, white gasoline or soap water. **Gasoline with additives or any fluid or solvent containing acetone, ethyl acetate, ethylene dichloride, toluene, etc., must not be used or bowl will be damaged.**
4. Unscrew and remove the dome; unscrew and remove the internal oil adjusting screw.
5. Wash the screw assembly and blow off the sintered element with compressed air.
6. Wash the body assembly, and blow out the air and oil passages with compressed air.
7. Replace the internal adjusting screw and replace the dome.
8. Fill the bowl with oil as described under step #2 of OPERATION instructions.

MINI AIR LINE FILTERS



OPERATING RANGES

WORKING PRESSURE.....150 psi maximum
TEMPERATURE RANGE.....+10°F. to +125°F.

INSTALLATION

Filters must be installed with air flow in the direction indicated on the body. When used with a regulator and/or lubricator, the filter should be installed upstream from these units. Filters should always be installed as far as possible downstream towards the point of air use. Mini-Filters must be installed with the transparent bowl hanging down so that trapped moisture will collect in the bottom of the bowl.

NOTE: Due to rough handling in transit, the visual filtergard indicator may look "yellow" when the filter is received. It must be reset before the filter can be placed in service. Unscrew the dome, reset the indicator, and replace the dome.

OPERATION

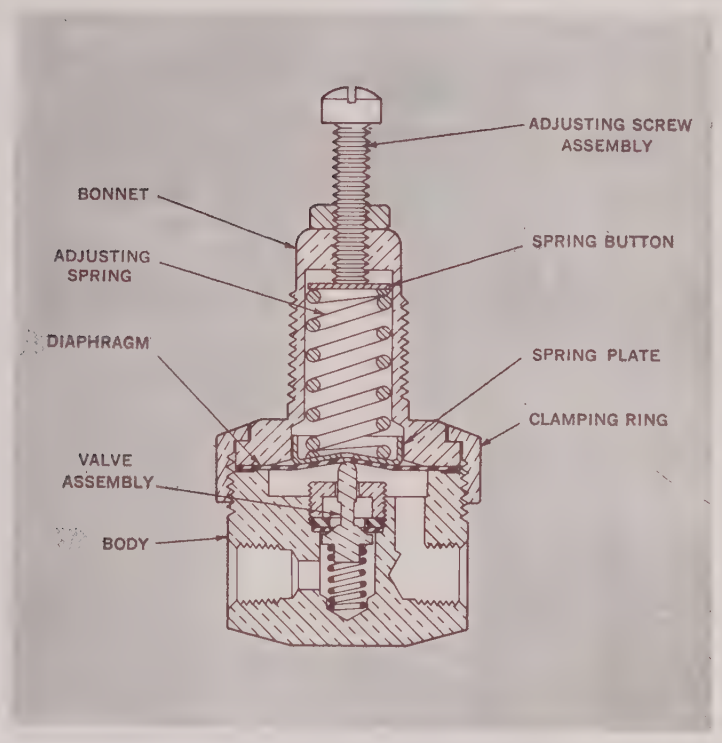
1. Solids and free moisture are automatically removed by the Mini-Filter.
2. Accumulated moisture must be drained whenever it fills the reservoir bowl to the level of the filter element. To drain the bowl, push up on the petcock stem.
3. When the filter element requires cleaning, the visual filtergard indicator will look "yellow." Once the indicator has popped up, it will remain up regardless of air flow or pressure change.

CLEANING

CAUTION: Do not attempt to remove bowl under pressure.

1. Shut off the air supply and depress the petcock stem to bleed down residual pressure.
2. Unscrew and remove the clamping ring.
3. Remove and invert the bowl assembly. The filter element will drop out of the bowl assembly.
4. Wash the filter element and bowl in kerosene, white gasoline, or soap water. **Gasoline with additives, or any fluid or solvent containing acetone, ethylacetate, ethylene dichloride, toluene, etc., must not be used or bowl will be damaged.**
5. Dry the filter element by blowing compressed air from the inside outward after washing.
6. Unscrew the dome and manually reset the yellow indicator.
7. Reassemble the unit.

MINI AIR LINE REGULATORS



OPERATING RANGES

PRIMARY PRESSURE.....250 psi maximum
DELIVERY PRESSURE.....5-125 psi
TEMPERATURE RANGE.....+10°F. to +165°F.

INSTALLATION

1. To assure dependable operation, a Mini-Filter should be used with the regulator to guard against contamination from foreign matter.
2. Regulators must be installed with air flow in the direction indicated on the body. When used with a filter and/or lubricator, the regulator should be installed between these units with the filter on the upstream side and the lubricator on the downstream side. Regulators should always be installed as far as possible downstream towards the point of air use.
   Mini-Regulators may be installed in any position for convenient adjusting screw operation with no loss in operating characteristics.

SERVICING

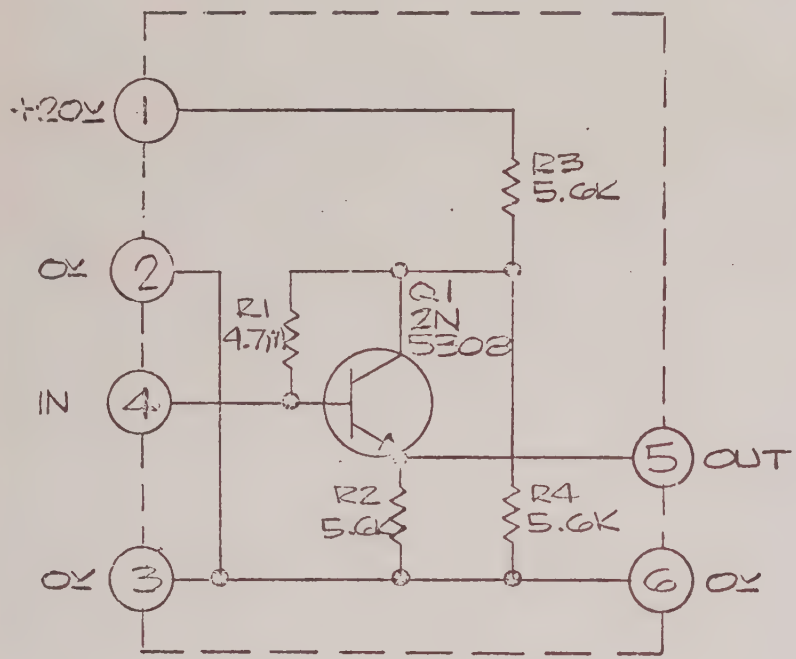
CAUTION: Do not attempt to disassemble regulator while line is under pressure.

If regulator requires servicing, it can be completely disassembled while still installed in the air line.

PRESSURE ADJUSTMENT

Regulator adjustment must be made with the line pressure valve open. Carefully follow these steps:

1. Turn the regulator adjusting screw counter clockwise to release compression from the adjusting spring.
2. Open the line pressure valve.
3. Adjust the operating pressure by turning the adjusting screw clockwise until the gauge indicates the desired pressure.
4. To lower the pressure setting, turn the adjusting screw counter clockwise until the gauge reading is approximately 5 psi lower than the desired delivery pressure. Then, slowly turn the adjusting screw clockwise until the desired pressure is obtained.
5. When the required pressure has been determined under normal operating conditions, the adjusting screw lock nut should be tightened to prevent tampering.



NOTE:

1. ALL RESISTORS ARE 1/4W, 5% CARBON.

REVISIONS			
LTR.	DESCRIPTION	DATE	APPROVED

SERIAL NOS.	DATE EFF.	DWG. REV. LTR.

EFFECTIVITY

NEXT ASSY.	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED THE FOLLOWING APPLIES:
BREAK ALL SHARP EDGES .005
MAX., SURFACE ROUGHNESS 125 RMS
THDS. INT. CL. 2B, EXT. CL. 2A

DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 ANGLES ± ½°
DECIMALS .XX ±.010
.XXX ±.005

MATERIAL:

FINISH:

	BY	DATE
DESIGN		
DRAFTED	MGE	7-26-67
CHECKED		
APPROV.		

DO NOT SCALE DRAWING

PART NO.

DELTA DESIGN INC.
8000 FLETCHER PKWY.
LA MESA, CALIF. 92041
TEL: A/C (714) 465-4141

TITLE:
SCHEMATIC - PHOTO
DETECTOR BUFFER BD.

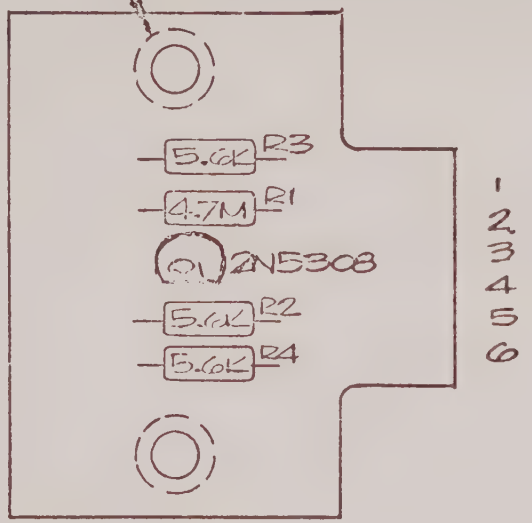
SIZE	CODE IDENT. NO.	DRAWING NO.	REV. LTR.
A		1634733	

SCALE NONE

SHEET 1 OF 1

REVISIONS			
LTR.	DESCRIPTION	DATE	APPROVED
A	INCREASED CONN 3RD SIZE ADDED 1 STANDOFF	8-6-71	
B	REVERSED Q1	9-10-71	

MOUNT STANDOFF FARSIDE 2 PLCS



ALL RESISTORS ARE 1/4W, 5% CARBON.

SERIAL NOS.	DATE EFF.	DWG. REV. LTR.

EFFECTIVITY

NEXT ASSY.	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED THE FOLLOWING APPLIES:
BREAK ALL SHARP EDGES .005
MAX., SURFACE ROUGHNESS 125 RMS
THDS. INT. CL. 2B, EXT. CL. 2A

DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 ANGLES ± ½°
DECIMALS .XX ±.010
.XXX ±.005

MATERIAL:

FINISH:

	BY	DATE
DESIGN	MGE	3-6-71
DRAFTED	MGE	3-6-71
CHECKED	MGE	3-6-71
APPROV.		

DO NOT SCALE DRAWING

PART NO. 1634785

DELTA DESIGN INC.
8000 FLETCHER PKWY.
LA MESA, CALIF. 92041
TEL: A/C (714) 465-4141

TITLE:
: CIRCUIT CARD ASSY-PHOTO
: DETECTOR BUFFER BOARD

SIZE	CODE IDENT. NO.	DRAWING NO.	REV. LTR.
A		A2634785	E

SCALE 2:1 SHEET 1 OF 1

DELTA DESIGN, INC.
8000 FLETCHER PKWY.
LA MESA, CALIF. 92041
TEL. (714) 465-4141

	By	Date
Drafted		
Pilot Run App'd.		
Production App'd.		

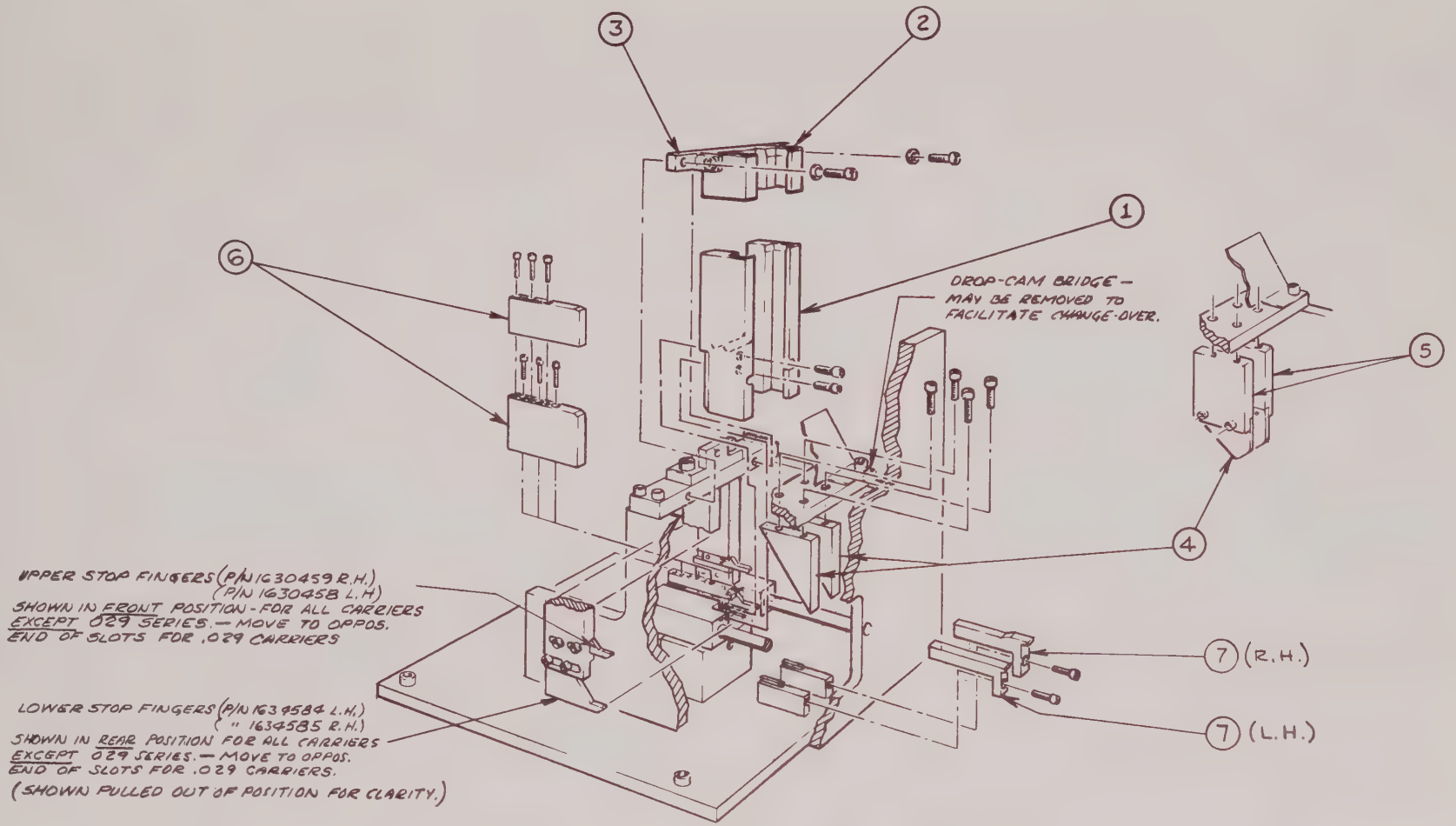
Parts List P2634785 | Rev. | Sheet 1 of 1

Description: CIRCUIT CARD ASS'Y PHOTODETECTOR BUFFER BD.

Next Ass'y. Parts List

Item	Qty.	Drawing Number	Description	Manufacturer and Part No	Stock No.	Fab Cod
	REF	A2634785	CIRCUIT CARD ASS'Y			
1	REF	A1634783	SCHEMATIC			
2	REF	A1634784	DRILL INSTRUCTIONS			
3	1		TRANSISTOR Q1	2N5308 G.E.	1205308	
4	3		RESISTOR R2,3,4 5.6K Ω 1/4 5%		0305624-500	
5	1		RESISTOR R1 4.7 Ω 1/4 5%		0304704-500	
6	2		STAND-OFF		4100006	

Rev.	Date	App'd.	Revision Description


3
2
1
6
DROP-CAM BRIDGE — MAY BE REMOVED TO FACILITATE CHANGE-OVER.
5
4
UPPER STOP FINGERS (P/N 1630459 R.H.)
(P/N 1630458 L.H.)
SHOWN IN FRONT POSITION - FOR ALL CARRIERS EXCEPT 029 SERIES. — MOVE TO OPPOS. END OF SLOTS FOR .029 CARRIERS
7 (R.H.)
LOWER STOP FINGERS (P/N 1634584 L.H.)
(" 1634585 R.H.)
SHOWN IN REAR POSITION FOR ALL CARRIERS EXCEPT 029 SERIES. — MOVE TO OPPOS. END OF SLOTS FOR .029 CARRIERS.
(SHOWN PULLED OUT OF POSITION FOR CLARITY.)
7 (L.H.)

CARRIER CHANGE-OVER PARTS REQUIREMENT

ITEM	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
PART	TRANS. CHUTE	ADAPTER CHUTE	CHUTE BRACKET	DROP CAM	DROP CAM SUP'T	TRANS. SUPPORT	RAMP	INPUT CHUTE	OUTPUT CHUTE	MAGAZINE
CARRIER NO. & SIZE								(NOT SHOWN)	(NOT SHOWN)	(NOT SHOWN)
029-.75"x1.0"	1634571	1634574	1634579	1634587	1634586	1634588 (DO NOT REMOVE)	1634592 L.H. 1634593 R.H.	2634594	2634598	2630660
039-1.25"x1.25"	1634573	1634575	1634580	1633815	NOT R'Q'D.	1634602	1634720 L.H. 1634721 R.H.	2633982	2634004	2633977
039-1.25"x1.70"	1634572	1634576	1634580	1633586	NOT R'Q'D.	1634603	1634590 LH, 1634591 R.H.	2634642	2634849	2633977
039-1.25"x2.5	1633567	1634578	1634580	1633602	NOT R'Q'D.	1634605	"	2634642	2634849	2633977
039-2.0"x2.0"	1633796	1634577	1634581	1633806	NOT R'Q'D.	1634604	"	2633920	2633926	2633913

9-15-71
A-09710021

FIGURE 11

CARRIER-HANDLER MECHANISM ORIENTATION CHART

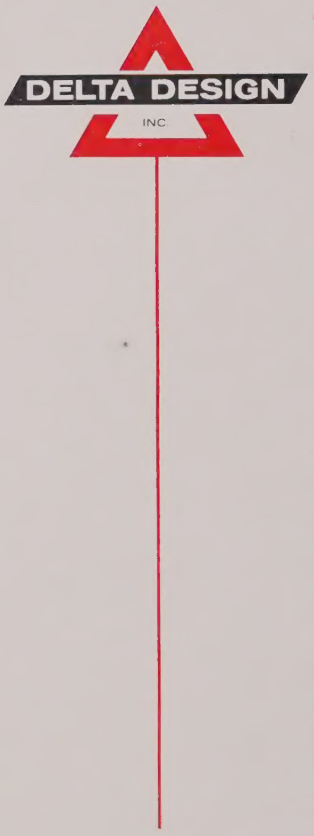
MULTI-PACK ENVIRONMENTAL HANDLER Model 8195 — DELTA DESIGN INC.

CARRIER W X H	TRANS CHUTE	ADAPTER CHUTE	CHUTE BRACKET	DROP CAM	DROP CAM SUPPORT
029 .75 x 1.0	C1634751	B1634574	B1634579	B1634587	B1634586
039 1.25 x 1.25	C1634573	B1634575	B1634580	B1633815	—
1.25 x 1.7	C1634572	B1634576	B1634580	B1633586	—
1.25 x 2.5	C1633567	B1634578	B1634580	B1633602	—
2.0 x 2.0	C1633796	B1634577	B1634581	B1633806	—

CARRIER W X H	TRANS SUPPORT	RAMP	INPUT CHUTE	OUTPUT CHUTE	MAGAZINE
029 .75 x 1.0	B1634588 (Do Not Remove)	B1634592 L.H. B1634593 R.H.	C2634594	D2634598	B2630660
039 1.25 x 1.25	B1634602 039 Base	B1634720 L.H. B1634721 R.H.	D2633982	D2634004	C2633977
1.25 x 1.7	B1634603	B1634590 L.H. B1634591 R.H.	D2634642	D2634849	C2633977
1.25 x 2.5	B1634605	"	D2634642	D2634849	C2633977
2.0 x 2.0	B1634604	"	D2633920	D2633926	C2633913

WARRANTY

All parts and performance of the Model 8195 Multi-Pack Environmental Handler assembly are warranted for a periof of 90 days. Where components are warranted by the manufacturer (other than Delta Design Inc.,) such warranty is transferred to the customer.



SAN DIEGO, CALIFORNIA

MP MASTER
MA32440